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JUNE 18, 1956

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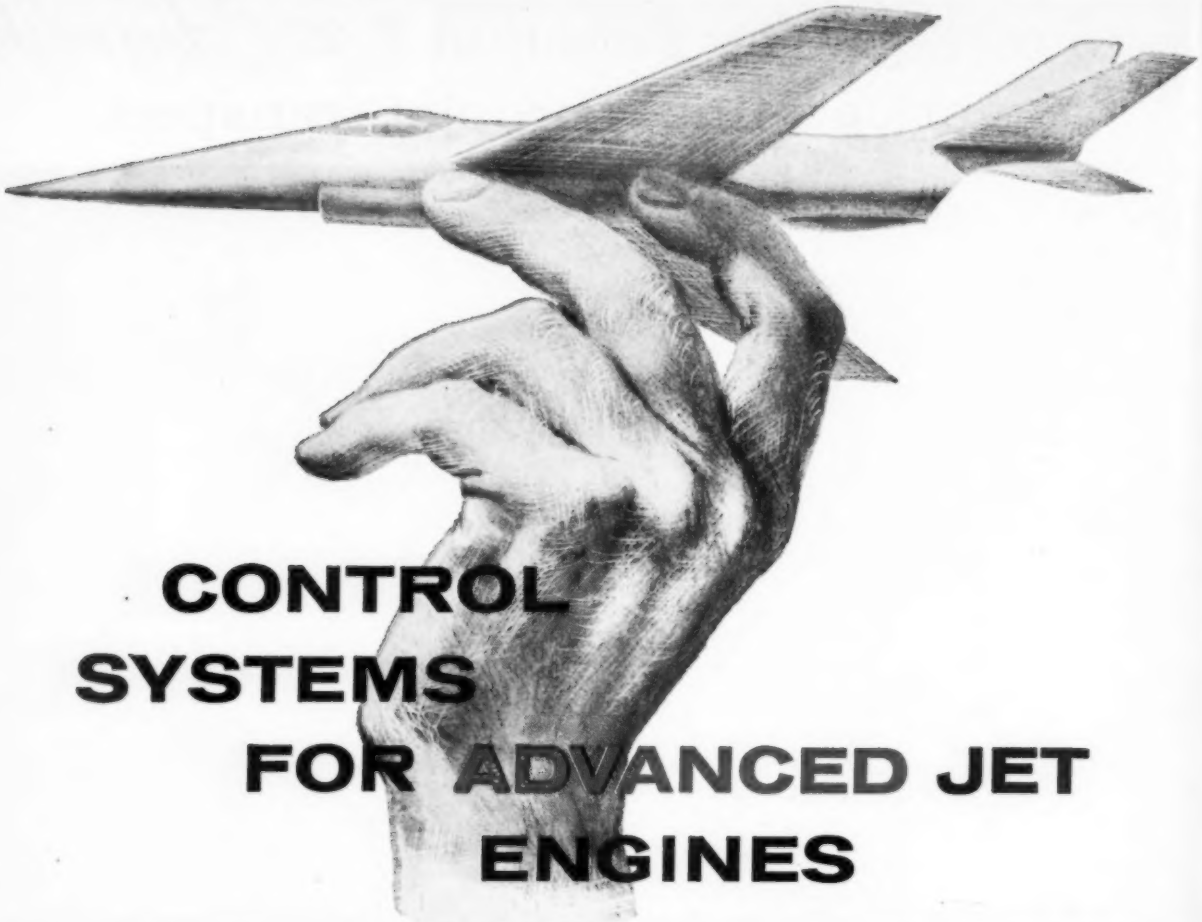
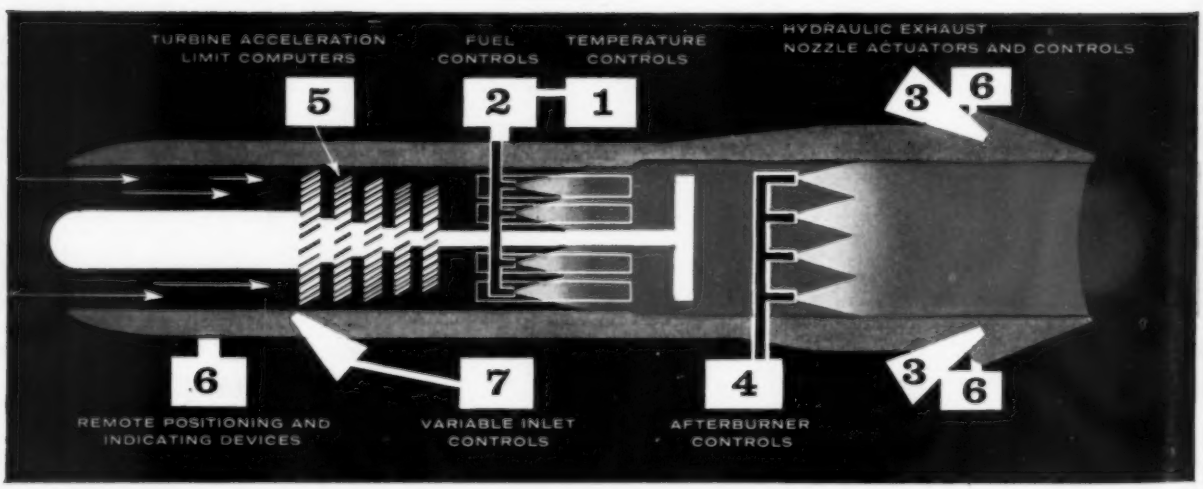


CONTROL SYSTEMS FOR ADVANCED JET ENGINES



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Voice of the Industry Since 1937

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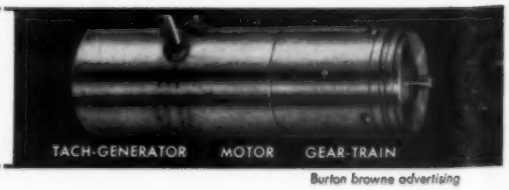

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Personal View

By WAYNE W. PARRISH

Howard Hughes: Aviation's Top Enigma

HOWARD HUGHES has petitioned the Civil Aeronautics Board to approve an arrangement by which Trans World Airlines can purchase from Hughes Tool Company some twenty-five long-range jet transports which Hughes says he plans to design and build because no existing or planned jets meet his requirements.

We have no idea how CAB will reconcile Mr. Hughes' petition with the statutory prohibition against mixing aircraft manufacturing and airline ownership, for it's scarcely any secret that Mr. Hughes is the sole owner of Hughes Tool Company and is 74% owner of TWA.

We aren't as concerned with these interlocking arrangements and the recent petition, however, as we are with what is happening to Mr. Hughes and his heavy responsibility as the 74% owner of one of the largest and most important American air carriers.

Generally speaking, Howard Hughes has long been considered sacrosanct. He is virtually legendary in his manner of doing business. Stories about him are legion. His basic shyness has been intensified by partial deafness although he has no cause to be sensitive about a minor deficiency which, at 51 years of age, is hardly a rarity in the human race.

He keeps well secluded. He either dislikes or distrusts the press. (We've tried many times unsuccessfully to talk with him directly.) He has a vast organization—including the highly successful Hughes Aircraft Company—which is at his beck and call. His contacts with the public are almost always confined to a public relations firm. Whether he really is or not we couldn't know, but he is accepted as a man of mystery with far-reaching power. From what we have heard with some reliability, he admits to his few close associates that he's difficult to work for and with.

But there is one over-riding quality about Howard Hughes about which there can be no argument. That is his deep and abiding interest in, and fascination for, anything that moves through the air, be they airplanes, vertical-rising machines, or missiles.

It was Howard Hughes who captured the world land speed record of 352 mph in 1935 with the H-1 which he designed and built himself. He established a trans-continental speed record in 1937 (7 hrs. and 28 min.). In 1938 he flew around the world in 91 hours and 14 minutes, no small feat at that time. He aided in the design of the Constellation from the outset. He has received numerous honors and trophies of which he is rightfully proud.

It wasn't until 1938 that Howard Hughes acquired an airline. Lehman financial interests in New York had controlled TWA. Jack Frye, then TWA president, was anxious to get new sponsorship. Hughes wasn't difficult to persuade. It was one of the biggest of the early airline deals. In 1947 Frye and Hughes came to a bombastic parting of the ways and through the years Hughes has increased his holdings to the present dominant 74%.

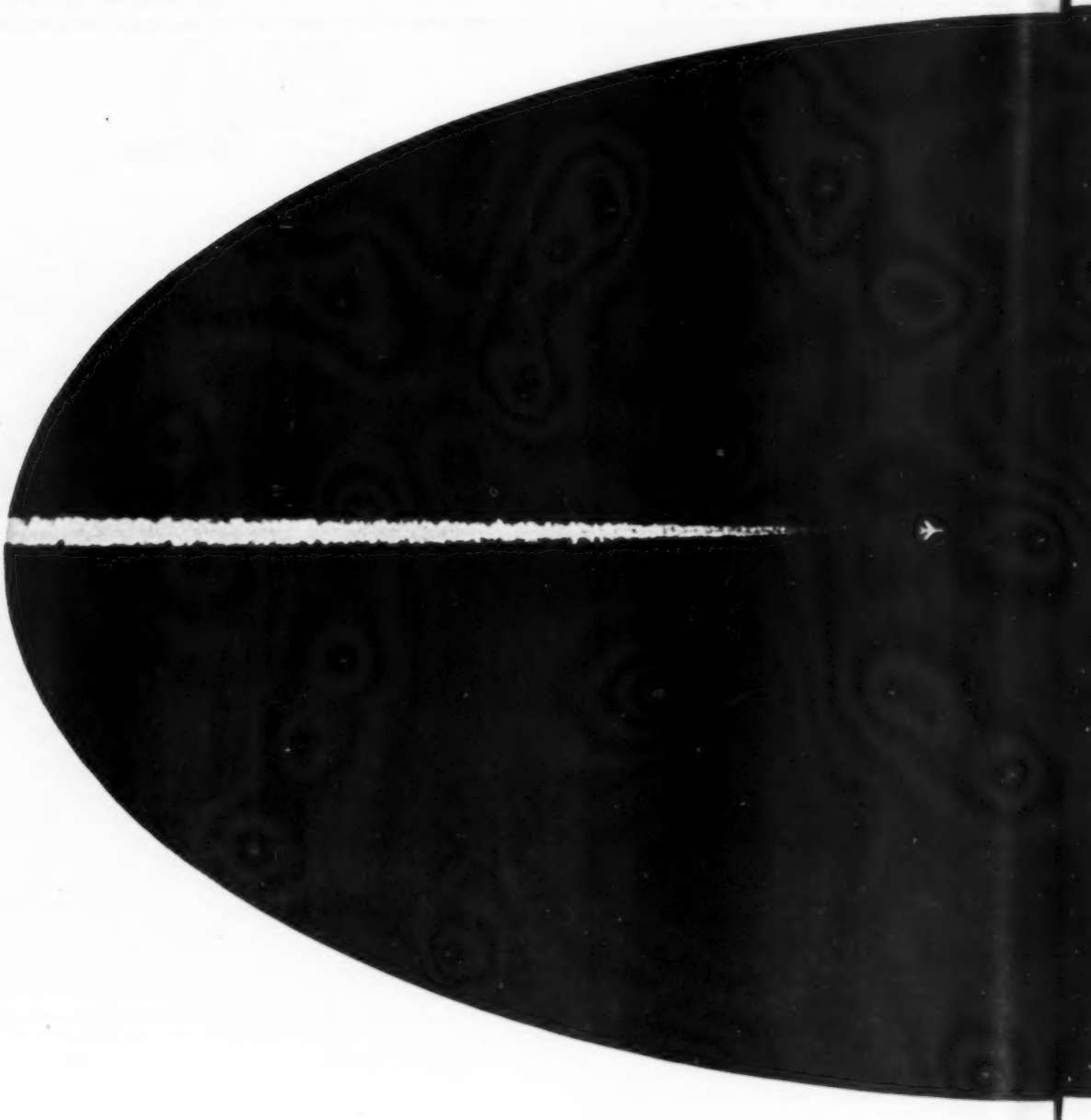
No group of people in the country have been more loyal to Howard Hughes than those of TWA since the Frye shakeout. They will deny down to the last dollar that anything is out of whack with their present situation. But no one can be close to the airline industry without knowing that Howard Hughes is handicapping his own airline. Since the passing of Ralph Damon, there has been no president. There are plenty of capable top executives in the company but no organization can function for long without clear-cut authority and clear-cut leadership. A decision rests solely with Howard Hughes who is largely unavailable.

We think Howard Hughes' many aviation interests are good for the country. We are somewhat staggered by the cost of the almost-forgotten huge wooden flying boat still sitting out in Long Beach harbor, but the total benefits arising from Hughes' various activities have outweighed the misses. We even think he might come up with something novel in the way of a long-range jet transport given the time required for such a new project.

But meantime we wonder if Mr. Hughes is fully aware of management responsibilities for a public carrier in a highly competitive market. It is a complex business. Decisions on equipment are critical. They can't be passed over while dreaming of something far in the future. But an airline is much more than airplanes—there are a multitude of other decisions to be made. An airline and its people and its customers and its responsibilities nationally and internationally to the country are all a serious trusteeship. A public carrier is a franchised privilege under public regulation. And whether anybody will admit it or not, the truth is that TWA is in a bad spot and facing a tougher one unless and until its principal owner permits its operation as a normal business capable of making decisions, meeting competition and planning its future.

We are a firm believer in individual rights and letting people live as they wish so long as this doesn't interfere with others. So we are sympathetic to Howard Hughes in many respects. But time and the world have been moving along rapidly. We wonder if Mr. Hughes has been moving along as well. We think that he, the nation and his airline would benefit if he would make a new 1956 appraisal. If he takes a close enough look we suspect he might well take a 1956 approach to the public carrier which he controls as well as owns.

NORTH AMERICAN HAS BUILT MORE AIRPLANE



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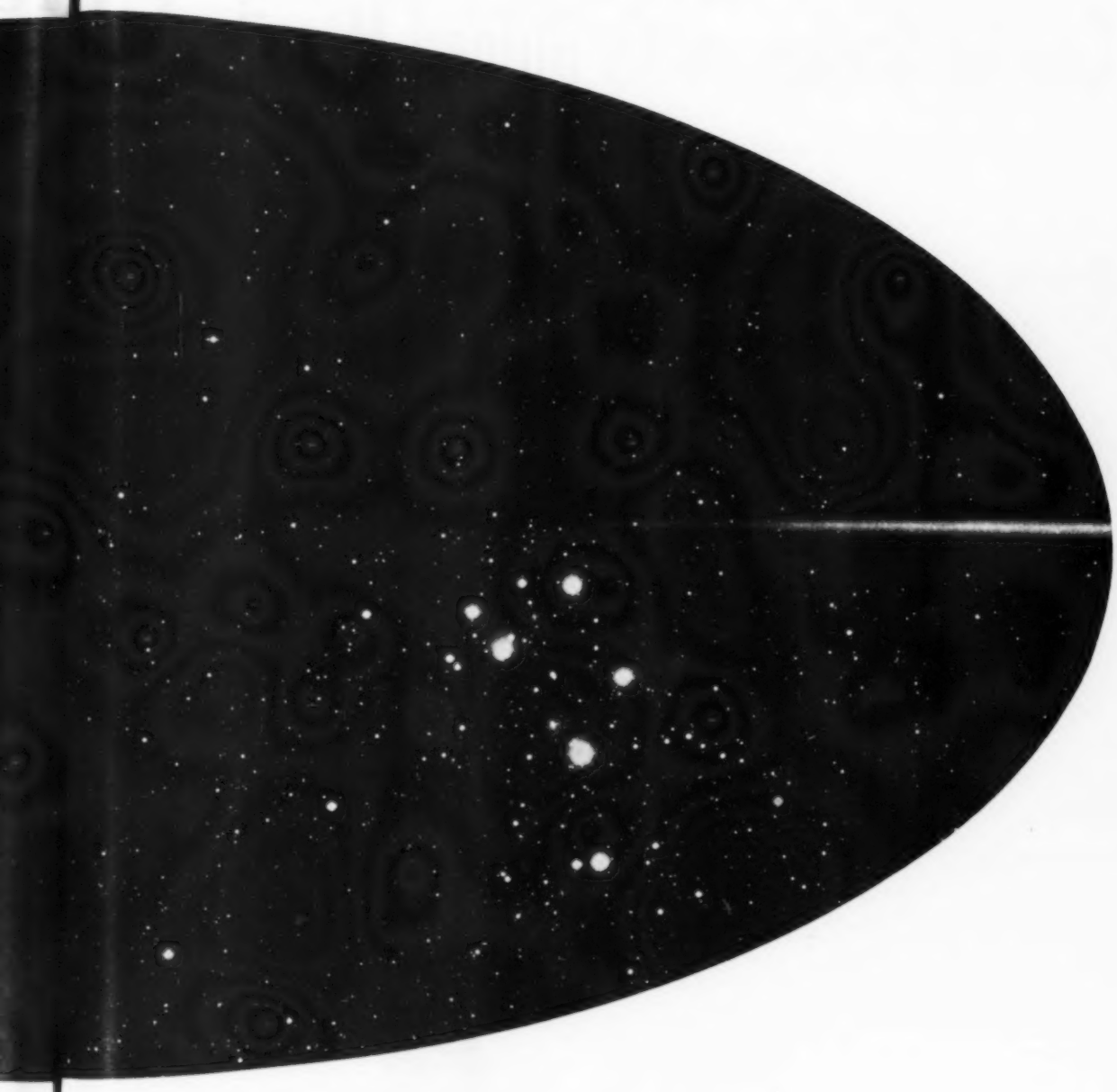

BEYOND SIGHT
TOMORROW

Side by side with North American's continuous development of improved supersonic manned aircraft is the work on an equally vital project—complete weapons system responsibility for the U.S. Air Force SM-64 NAVAHO Intercontinental Guided Missile. This automatically controlled and guided "bird" will be driven by a high-thrust rocket engine, and will fly higher and faster than man can see with the naked eye. The Air Force NAVAHO project is a major factor in our country's program of developing long-range missiles.

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Washington Report

What to Expect in Renegotiation

Defense contractors can look forward to two more years of renegotiation (AMERICAN AVIATION April 9), but there will be some major changes.

Here are some liberalizations you can expect:

• **Statutory sales floor** for renegotiation to be raised from $500,000 to $1 million.

• **Filing of statements** that your sales were below minimum to be changed from mandatory to optional.

• **No special emphasis** on the net worth factor in determining excess profits.

• **Renegotiation to be confined** to contracts with Defense Dept., Army, Navy, Air Force, Atomic Energy Commission, Maritime Administration and General Services Administration.

• **Loss carry-forward period** to be increased from one to two years in determining profits for fiscal years ending on or after Dec. 31, 1956.

These are some of the major recommendations, made after months of consideration by industry, government and congressional leaders, that now are before Congress for action after joint Senate-House committee approval.

The committee, made up of senior members of the Senate Finance Committee and House Ways and Means Committee, gives two reasons for raising the statutory sales floor:

Renegotiation creates serious, expensive compliance problems particularly burdensome to small business, and "present floor prevents the Board (Renegotiation) from concentrating on the large cases where the amounts involved justify the complicated procedure."

That One-Uniform Concept

Quick to seize advantage of the recent public feud between the services, the Air Force and its backers in mufti have launched an energetic campaign to reorganize the military establishment into a single service under the command of a single chief of staff.

Gen. Thomas White, Deputy USAF Chief of Staff, publicly supported the idea in a San Francisco speech, and his boss, Gen. Nathan Twining, advanced the cause of unification in a classified speech before the National War College. Other proponents include Gen. Carl (Tooey) Spaatz (Ret.), former AF Chief of Staff, and two former AF Secretaries, Thomas K. Finletter and Sen. Stuart Symington (D-Mo.).

But though there were plenty of words on the subject, action was conspicuously absent. A major news magazine flatly reported that President Eisenhower had directed his staff to prepare a unification plan, but this could not be confirmed at either the White House or Pentagon. Sen. Symington, in fact, ridiculed the report, noting that the President repeatedly urged real unification prior to his election, but that the Administration has yet to propose a single change in the National Security Act of 1947.

• **Pentagon observers** were generally dubious about the prospects for a single service. Commented one veteran Pentagon spokesman: "It will take quite a bit more than a little fussing between the services to get the White House—or Congress—to do anything about reorganizing the government's number one problem child."

Nevertheless, the airmen offer some pretty convincing arguments to support their unification drive. In the first place, they contend, a single service would virtually eliminate the competition and wasteful duplication that now exists in the military establishment, as well as the debilitating fights between the services. But even more important, they argue, a single military chief of staff for the entire Defense Department could reach decisions faster and more surely than the present Joint Chiefs of Staff, whose decisions on knotty problems are frequently marked by long delays and interservice horse-trading.

But it's not likely the Army and Navy will be easily talked into accepting the Air Force prescription for curing the Pentagons' woes. The soldiers and sailors fear that the standard military uniform proposed by the airmen would look a great deal like the Air Force blue suit, and they may be expected to fight to the last gasp to prevent a merger.

Minetti Gets VIP Treatment

Lack of enthusiasm in the Democratic Congress for CAB Member-nominee G. Joseph Minetti was more than offset by a show of Republican Administration support when he was sworn in at the White House last week.

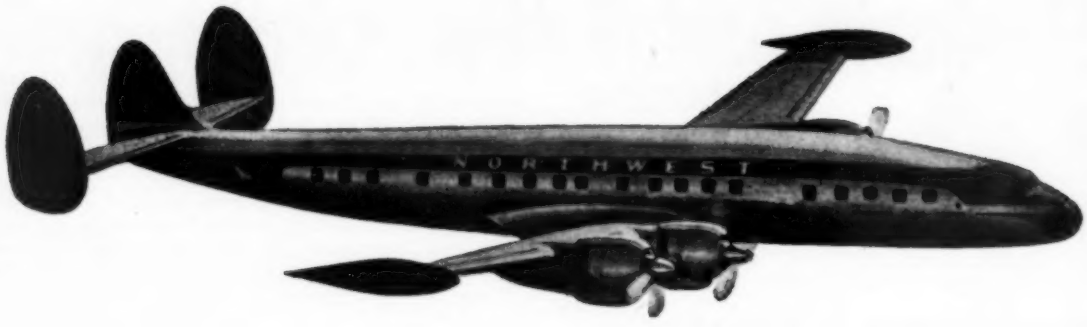
Minetti, Brooklyn Democrat, waited almost six months for Congress to clear his nomination. But at 2 p.m. June 11 he became the first individual CAB Member to be sworn in at the White House in that agency's 18-year history.

At the ceremony, he was flanked by Presidential Assistant Sherman Adams and Commerce Secretary Sinclair Weeks while Frank K. Sanderson, White House administrative officer, administered the oath. No Republican Member ever got such top-brass treatment. Normal routine is for a new Member to be sworn in by a local judge in the Board room of Commerce Building.

Exodus at ANDB Continues

Air Navigation Development Board, already hard hit by recent loss of several key personnel (AMERICAN AVIATION June 4, p.11), is facing even darker days: exodus of experienced engineers for better jobs in industry is continuing at an unrelenting pace.

Latest losses: C. S. Bartholomew, who headed ANDB's project coordinating group, leaves July 15 to join Lockheed's missile research division at Palo Alto; B. E. Montgomery, only key staff engineer left in ANDB's systems engineering group, also is joining Lockheed, but at its Georgia Division.



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Letters

Scotch Yarn

To the Editor:

Those Bloody Scots!

"I was born in Glasgow, Scotland, and have been connected directly or indirectly with aviation since 1915, which certainly makes me somewhat of an old timer."

The foregoing, except the first three words, is the opening to a letter in your May 7 issue and that, together with all the laudatory comments on "It's the season for going off rockers" gave me pause for a moment and hurriedly to consider whether I had gone off my rocker.

You see, I could have written that first sentence without changing one single word, but I couldn't for the life of me remember having mailed anything of the sort to your excellent publication.

Then I glanced down to see who had signed what could have been the start of a letter of my own and there, to my extreme delight, discovered the culprit was an old and very good friend whom I haven't seen since one night in Cleveland in 1942 with the late, lamented Pop Cleveland—but that's another story.

I remember, upon his arrival in the U.S.A., Sam (Editor's Note: Sam Irvine, author of the letter in question) worked for a short time for the late Lawrence Sperry over in Long Island and then joined us in the construction of the Barling bomber, the most remarkable aeroplane of its time, at Hasbrouck Heights, N.J.

As an exercise of my good memory (Sam can correct me if I am in error), he then was in Buffalo for a few years before joining Aero Supply Manufacturing Co., where his outstanding record through all the years since is clearly substantiated by his present position of Chairman of the Board.

There are three Clydeside-born-and-bred Scots who have been known in American aviation for a good many years. The other one is Robert MacCulloch, president, Temco Aircraft Corp., and as a further test of memory, Bob MacCulloch was Denny's, Dumbarton, while Sam Irvine was Stevens, Linthouse.

You see, Clydeside engineers are known throughout their lives by the firm and spot where they got their training.

Clyde Built and Clyde Trained—"Second to none."

"Those bloody Scots!"

G. MacLEAN GARDNER, President
Varsity Engineering Inc.
Ann Arbor, Mich.

Add Compliments

To the Editor:

I must thank you very much for the article in the May 7 issue (by Henry P. Steier) which is undoubtedly the best analysis which has ever been made of the Radio-WEB system.

I believe that this system would be not only a reliable navigation aid at any distance or altitude, but also, as you said, "a cheap substitute for radar." This substitute could perhaps replace radar for economical reasons, if international tensions lessen; but it could, at any rate, be used in the areas where it is impossible to obtain a radar coverage, such as oceans and deserts, and actually by nine-tenths of the international airlines in Asia, Africa, Pacific and South America.

The necessity of Air Traffic Control on the main parts of such lines will become obvious in the near future, and I don't know of other systems than Radio-WEB giving this possibility.

P. GAUDILLERE
Societe Francaise des Telecommunications
Neuilly sur Seine, France

To the Editor:

As a designer and builder of airline maintenance equipment, we were particularly impressed with your editorial of April 23 entitled "The Airplane Leads a Merry Chase."

LES JONES
Chief Engineer
International Aircraft Service, Inc.
Sun Valley, Calif.

Liked Murphy Story

To the Editor:

I have read and enjoyed very much Joseph Murphy's article on TWA's Overhaul Base in the May 7th issue of AMERICAN AVIATION. It tells such an excellent and complete story of our new facilities that we would like very much to make use of the reprint as a direct mail piece to our travellers in the San Francisco Bay Area.

HARRY A. DANGLER
Sales Promotion Manager
Trans World Airlines, Inc.
San Francisco, California

Industry News Digest

Symington Probes Deep into Air Force R&D Program; Watch for New Fireworks

Some noisy fireworks are about to go off in the middle of the Air Force research and development program. When the dust clears away, there may be some important changes in the present organization of the airmen's R&D activities, as well as in the level of their financial support.

Preparing the fireworks is the airpower investigating subcommittee headed by Sen. Stuart Symington (D-Mo). The group is getting ready to release a censored version of the testimony of Lt. Gen. Donald Putt, Deputy Chief of Staff of the USAF for Development, on the shortcomings of the Air Force R&D effort. It was described by one staff official as "very revealing and interesting."

• **Gen. Putt's testimony** could shake the Administration even more than the dire warnings of Gen. Curtis LeMay, head of the Strategic Air Command, or Gen. Earle Partridge, boss of the Continental Air Defense Command. While these officials confined themselves mainly to the problems of the near future and rarely beyond 1960, Gen. Putt, by the very nature of his job, is operating in the more distant future. It is in this area, where R&D is said to be the key to weapons superiority, that the Administration could prove most vulnerable to charges of short-sightedness.

The airpower probers also planned to hear other prominent witnesses on the subject of Air Force weapons development. They included Trevor Gardner, former Assistant AF Secretary for R&D, who quit his post in February because he wanted more research money, and James Killian, president of Massachusetts Institute of Technology, who played a decisive role in the adoption of the nation's continental defense system. Gardner was scheduled to testify before a closed session of the subcommittee last Thursday, while Killian is expected some time this week.

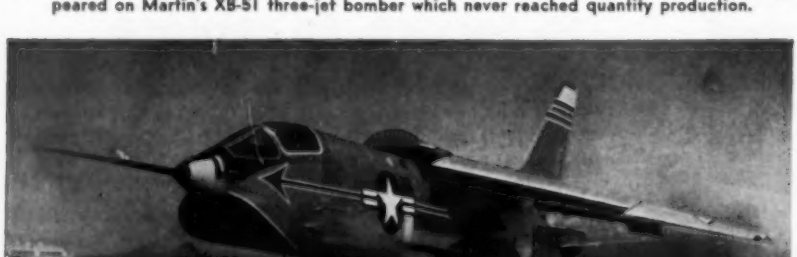
But equally significant developments in the Air Force R&D picture are presently taking place at AF headquarters in the Pentagon. Richard E. Horner, Gardner's replacement as Assistant Air Force Secretary for R&D, told AMERICAN AVIATION that a study is under way to determine exactly how much is spent for R&D activities in the AF, and to identify the source of the funds. The purpose is to provide better control over R&D activities and, probably more important, to delineate the areas in which extra funds are needed.

• **The job of finding out** how much the Air Force spends on exploring and perfecting new weapon systems and other hardware is not as simple as it might appear. That is because the bulk of the funds spent for R&D do not come from an appropriation with that label, but rather from Maintenance and Operation funds or Procurement funds. For example, while Horner's office expects to administer the obligation of $610 million in R&D funds in fiscal 1957, beginning July 1, it's estimated that total AF outlays for this activity will amount to between $2 billion and $3 billion during the year.

This creates a host of headaches for Horner and his civilian and military aides. For while they have the responsibility for programming the entire AF R&D effort from first idea through testing of the last prototype, their control over money to do the job falls far short of this. In fact, it is the Air Materiel Command which supports most of the prototype production and testing end of the job.

Navy Shows F8U's Moving Wing, Stabilizer

Navy has disclosed first details of two-position incidence wing on Chance Vought F8U-1 Crusader (above) that slows down the supersonic fighter for carrier landings. Note how portion of wing centersection is raised high above fuselage top surface; also, generous travel of F8U's movable horizontal stabilizer. This is first production use of wing concept—it also appeared on Martin's XB-51 three-jet bomber which never reached quantity production.



Fuselage of supersonic F8U-1 remains almost parallel to runway or carrier deck as raised wing supplies angle of attack for takeoff. Crusader's short gear, made possible by the wing feature, saves weight and simplifies maintenance as all compartments of the fighter become readily accessible for servicing.

CAA Facility to Monitor Mass Military Flights

CAA on July 15 will commission a new Central Altitude Reservation Facility (CARF) in Kansas City to act as a clearing house for all military requests for reserved altitudes in advance of mass flights and training missions.

New facility, to be headed by Medford Smith of CAA's Chicago control staff, will have jurisdiction in designated control areas at 14,000 ft. and above, east of the 100th meridian, and at 24,000 ft. and above, west of 100°.

CAA plan is to have CARF coordinate advance military flight plans with all CAA facilities involved and to make final decisions on use of requested airspace. All military requests for altitude reservations will be channeled by individual CAA control centers to the new Kansas City installation.

LeMay Testifies $3.8 Billion More Needed by SAC for Fiscal '57

As the Senate Appropriations Committee prepared this week to write its defense budget recommendations, these forces were at work exerting pressures that increased the likelihood of some Senate boost to Administration estimates:

• **Gen. Curtis LeMay** testified that SAC's latest U.S.-Soviet airpower estimates showed the need for an additional $3.8 billion in SAC appropriations for fiscal 1957, and an annual rate of about $8 billion for the next four or five years. SAC's share of the AF 1957 budget is about $5 billion.

• Sen. Stuart Symington was shaping a climactic finish for his Airpower Subcommittee, with probable emphasis on inadequacies in research and development, set, it was anticipated, to correspond with Senate debate on the defense appropriations bill.

• **The House** sent to the Senate a foreign aid authorization bill which included a $1-billion cut in the Administration's $3-billion military aid request. And the powerful Sen. Richard Russell, illustrating strong Senate sentiment, urged an additional $1-billion cut. Russell is among leading Senate Democrats advocating big boosts in the Administration's airpower budget.

• **Maj. Gen. Lee B. Washbourne,** AF Installations chief, testified he was about $1 billion behind authorized base construction in actual appropriations. He needed, he told the Symington Subcommittee, about $150 million a month during the next four years for new and conventional base requirements—about 50% above current Administration-approved programs.

• **Lt. Gen. Emmett O'Donnell,** chief of AF personnel, also told the Symington group the AF is so seriously undermanned the matter "must be given the highest priority." Worst shortage, he said, is in "hard core" technical fields, where higher pay from industry is luring the AF's best people away.

Republic Strike Ends; IAM Wins 17.5¢ 'Package'

The 111-day strike at Republic Aviation Corp. was settled when International Association of Machinists accepted the company's new 17½¢ per hour "package" pay increase offer.

The two-year contract provides an immediate 7¢ per hr. boost, another 7¢ on Apr. 1, 1957, an extra 3¢ on group insurance and medical plans, and a two-day lay-off notice guarantee or the equivalent in pay.

USAF Navy Orders Total $5.3 Billion

USAF and Navy placed a cumulative total of $5,325,000,000 in orders for aircraft and related equipment during the first 10 months of fiscal 1956. USAF accounted for $3,934,000,000, Navy for $1,391,000,000.

Total unobligated balances as of Apr. 30 included $6,680,000,000 for USAF and $2,896,000,000 Navy. For the first 10 months, cumulative outlays consisted of $4,882,000,000 in USAF payments and $1,459,000,000 by the Navy.

April procurement dropped to $487 million (USAF, $378 million; Navy, $110 million) after hitting $2,118,000,000 in March.

$51.8 Million Allocated In Airport Aid Program

Second phase of the $252-million four-year airport aid program has been announced, with 368 projects receiving allocations of $51,863,177 of the $63 million available in fiscal 1957. The balance will remain available through the end of fiscal 1958 in the apportionment for individual states, to give sponsors a chance to submit eligible requests.

Three hundred fifty-eight of the projects are in continental U.S., 260 for general aviation airports and smaller airline stops. This constitutes 73% of the total projects and 30% of the total fiscal year funds.

Highest single allocation was $1,250,000 which has been earmarked for eight sponsors each, including Atlanta, Chicago-O'Hare, Los Angeles, Miami, Minneapolis-St. Paul, New Orleans, New York-International and Oakland. Detroit (Wayne-Major) and Nashville will get $1 million each. Territorial allocations call for $1,155,000 for Alaska and $609,242 for Puerto Rico.

Gen. Twining to Watch Red Airpower Show

Gen. Nathan Twining, Air Force Chief of Staff, is scheduled to depart for Moscow this week to inspect a demonstration of Russian airpower June 24, Soviet Aviation Day. Accompanying Twining will be a small group of Air Force aides.

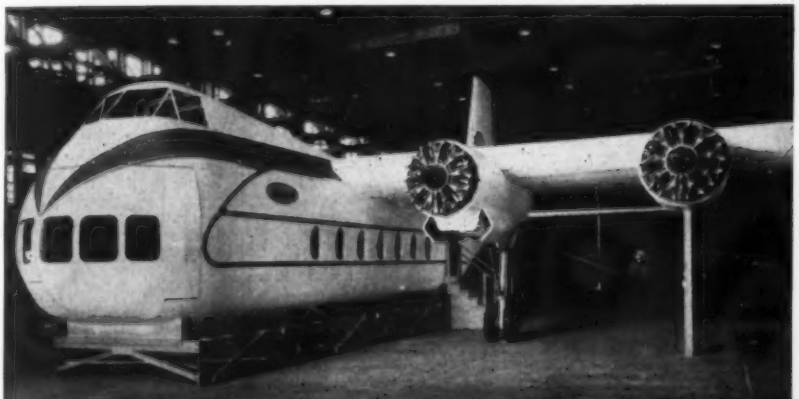
Future visits to Russia by other members of the Joint Chiefs of Staff are also in the offing. President Eisenhower authorized up to two of the nation's top military leaders to go to Russia simultaneously, provided the Reds agree to permit them "maximum time outside Moscow for visits to those activities of special interest to their own services."

IAS Honors Johnston

Institute of the Aeronautical Sciences has named A. M. "Tex" Johnston, chief of flight test for Boeing Airplane Co., winner of its 1956 Octave Chanute award. Johnston, first a test pilot on the B-47 and later project pilot on the B-52, is cited "for combining the practical with the scientific approach" in flight-testing high-performance jet aircraft and engines. Award will be presented in Los Angeles June 20.

(Continued on Page 19)

Frye Corp Shows Safari Mock-up



Mock-up of Frye F-1 Safari is combination cargo/passenger version of type ordered by Northern Consolidated Airlines, Wien Alaska Airlines and Cruzeiro do Sul. Mock-up has 25-passenger cabin and built-in Cargon system (see page 80).

When & Where

JUNE

June 17-21—Semiannual meeting American Society of Mechanical Engineers, Hotel Statler, Cleveland.

June 18-21—National summer meeting of Institute of Aeronautical Sciences, IAS Building, Los Angeles.

June 19—Tenth session of International Civil Aviation Organization Assembly, Caracas, Venezuela.

June 20-22—Aviation Distributors and Manufacturers Association 27th annual meeting, Grove Park Inn, Asheville, N. C.

June 28-30—Annual conference of the Institute of Navigation, Santa Monica, Calif.

June 30—Jet age conference, Sheraton-Jefferson Hotel, St. Louis, Mo.

JULY

July 7-10—Tenth annual All-Woman Transcontinental Air Race, San Mateo County (Calif.) to Flint, Mich.

July 10-Aug. 9—International Aviation Exposition, Mexico City.

July 15-30—World Parachuting Championship, Tuchino Airport, Moscow, USSR.

AUGUST

Aug. 1-5—Air Force Association annual convention, Roosevelt Hotel and Municipal Auditorium, New Orleans.

Aug. 3-5—Experimental Aircraft Assn. 4th Annual Fly-In, Oshkosh, Wis.

Aug. 15-17—IAS National Turbine-powered Air Transportation Meeting, Grant Hotel, San Diego, Calif.

Aug. 21-24—Western Electronics Show and Convention, sponsored by IRE and West Coast Electronic Mfrs. Assn., Pan-Pacific Auditorium, Los Angeles.

Aug. 22-24—Bendix Scintilla Int'l Ignition conference, Sidney, N. Y.

SEPTEMBER

Sept. 1-3—1956 National Aircraft Show, Will Rogers Field, Oklahoma City.

Sept. 3-9—Society of British Aircraft Constructors exhibition and flying display, Farnborough, England.

Sept. 9-11—International Northwest Aviation Council convention, Boise, Ida.

Sept. 12-22—International Air Races, U.S., England, South Africa.

Sept. 17—Annual general meeting International Air Transport Assn., Edinburgh, Scotland.

Sept. 18—Third Air Navigation Conference, Montreal.

Sept. 25-29—International Association of Aircraft Constructors jet transport conference, The Hague.

OCTOBER

Oct. 1-3—National Association of State Aviation Officials annual meeting, Lake Placid, N. Y.

Oct. 2-6—SAE National Aeronautical Meeting, Aircraft Production Forum and Engineering Display, Hotel Statler, Los Angeles.

Oct. 8-10—Second annual symposium on aeronautical communications sponsored by IRE, Hotel Utica, Utica, N.Y.

Oct. 10-12—SAE National Transportation Meeting, Hotel New Yorker, New York.

Oct. 23-25—National Business Aircraft Association 9th annual meeting and forum, Miami, Fla.

Oct. 25-26—Aircraft Electrical Society annual display of electrical equipment, Pan-Pacific Auditorium, Los Angeles.

Oct. 29-30—Third annual East Coast Conference on Aeronautical and Navigational Electronics, sponsored by IRE, 5th Regiment Armory, Baltimore.

NOVEMBER

Nov. 8-9—SAE national fuels and lubricants meeting, Mayo Hotel, Tulsa, Okla.

Nov. 26-30—Third international automation exposition, Trade Show Building, New York.

Industry News Digest

(Continued from Page 15)

CAB Adopts New Rule For Transport Copters

CAB has adopted, effective August 1, a new civil air regulation (CAR Part 7) to govern airworthiness requirements for transport helicopters. It divides future transport types into two categories, designated A and B, depending on the number of engines, gross weight and types of operation they involve.

CAR Part 6, which formerly covered all helicopters, is amended to cover only those in the "normal" category—up to 6,000 pounds gross weight.

Under CAR Part 7, a Category A helicopter will have no limit on gross weight, must be multi-engine, and is eligible for all types of operation including airline service under instrument and visual flight conditions.

Category B types are restricted to 20,000 pounds or less gross. They can be either single or multi-engine models and will qualify for HVR (helicopter visual rules) only.

Two PAA Groups To Visit Moscow

Pan American World Airways is planning to send two groups of officials to Moscow very shortly. Vice President Samuel F. Pryor told AMERICAN AVIATION that the first, which will leave as soon as its visas are received, will be a technical mission. It probably will be comprised of about four officials, including Harold E. Gray, executive v. p. of the Atlantic Division, and John T. Shannon, the division's operations manager.

The second PAA group, which will leave soon after the first returns, will probably include president Juan T. Trippe and vice presidents Samuel Pryor and Russell B. Adams. Gray will return to Moscow with the second group.

Kaman Announces Commercial Copter

The Kaman Aircraft Corp. of Bloomfield, Conn. has announced commercial availability of the K-600 five-place helicopter, an adaptation of its HOK-1 design now used as a small transport and rescue vehicle by the Marine Corps.

Specifications released by Kaman call for a top gross weight of 6,800 pounds, service ceiling of 17,000 ft. and rate of climb of 700 feet per minute. Maximum cruise speed at this weight is 88 knots at sea level and 92 knots at 8,000 ft. Useful load is 2,760 pounds.

TWA Pilot Gets Crack At Tu-104 Controls

A Trans World Airline pilot last month flew the Tupolev Tu-104 in the Soviet Union. Gari Ketcham, a TWA international route pilot, was allowed to take controls of the jet transport briefly during a 30-minute flight from Moscow airport.

Ketcham went to Russia as a tourist with the purpose of contacting airline pilots in that country. He made the acquaintance of Boris Bugaev, an Aeroflot international route pilot, who enabled him to make the flight in the Tu-104.

News Briefs

MANUFACTURING—MILITARY

• **Backlog** of complete aircraft, engines and propellers totaled $16,275,000,000 as of Mar. 31, 1956, up 4% over the previous quarter, Bureau of the Census and CAA report. Total is 15% over orders on hand at the end of 1955's first quarter.

• **Federation Aeronautique Internationale** has officially confirmed the world speed record of 1,132 mph (1,822 kmph) set Mar. 10 by Peter Twiss in a British Fairey Delta 2.

• **Procurement** of electronic countermeasure equipment will be handled by Dayton Air Force Depot, Gentile Air Force Station, effective July 1.

• **USAF's Office of Scientific Research** on July 1 will move from Baltimore to Temporary T Bldg., 14th & Constitution Ave., N.W., Washington, D. C.

• **The Texas Co.** opened a $250,000 jet fuels lab at Beacon, N. Y., said to be the largest privately-financed installation of its kind in the U.S.

• **The Douglas F5D Skylancer** made initial test flights in April and exceeded the speed of sound, it was revealed recently. Powered by a P&W J57, the F5D has "greatly increased speed, range and performance" over its predecessor, the F4D.

• **Institute of Defense Analyses** has been formed as a non-profit group for scientific analyses of present and future weapons systems for Defense Department's Weapons System Evaluation Group. Initial members are California Institute of Technology, Case Institute of Technology, Stanford University, Tulane University, and Massachusetts Institute of Technology. James R. Killian Jr., MIT president, is chairman of IDA's board of trustees.

• **Boeing Airplane Co.** established a $75 million open line of credit with 17 banks in Seattle, Wichita, Chicago, New York, Pittsburgh and San Francisco. The credit exhausts loaning capacities of all Seattle banks and the two principal banks in Wichita. Boeing has committed $73.5 million for facilities and equipment during the next two or three years. The credit runs through June, 1957.

• **Ryan Aeronautical Co.** was awarded a USAF contract for the XQ-2B, new version of the Firebee jet drone missile, which will be capable of high subsonic speeds and operation at altitudes over 50,000 ft. It will have a 1000-pound-thrust Fairchild FT-101-D1 turbojet engine.

TRANSPORT

• **Charles J. Lowen Jr.** was confirmed by the Senate as CAA Administrator. Sen. Thomas Wofford (D.-S.C.) voted against confirmation, but a floor battle did not materialize. Wofford had opposed CAA's policy of withholding federal aid funds which would be used for financing facilities in airport terminal buildings for the separation of the races.

• **Helicopter Air Service** was granted a seven-year certificate renewal by CAB, including first-time authority to carry passengers by helicopter in the general Chicago area. Passenger service was approved between the two Chicago airports and the downtown Loop area, and also within a 60-mile radius of O'Hara Field.

• **A $59.7-million** airport bond issue was approved by Los Angeles voters in the California primary election. New terminal and runways at Los Angeles International Airport will cost $49,650,000. Balance will go to San Fernando Valley Airport ($9.5 million) and for heliports ($525,000).

• **Aviatrix Jacqueline Cochran** won the Republican nomination for the House of Representatives from the Van Nuys district in the California primary.

• **Western Air Lines** placed $5 million 4¼% convertible subordinated debentures on the market at par and they were oversubscribed the first day.

• **Keith Granville,** former sales director of British Overseas Airways Corp., was named commercial director of the airline, reporting to managing director Basil Smallpiece. Gilbert Lee, general sales manager, is now responsible to Smallpiece for the company's selling effort, sales promotion and advertising. K. W. Bevan, former chief accountant, was named financial comptroller.

Allison-powered demon joins the fleet

McDonnell F3H-2N is Navy's Fastest All-Weather Fighter

The F3H-2N Demon recently began its tour of duty as an operational fighter of the U.S. Navy following a Fleet Introduction Program described as "one of the most successful ever held at Patuxent."

Six of these versatile McDonnell fighters, powered by the Allison J71 engine, were put through an accelerated flight and maintenance program by Naval aviators and maintenance personnel brought in from various Fleet squadrons.

The program—successfully completed more than a full week ahead of schedule—involved over 600 hours of intensive test flying under simulated combat conditions. It included catapult launchings, simulated carrier landings, night instrument flying, night intercepts, night formation flying and a full range of tactical maneuvers typical of combat fleet operation at all altitudes from sea level to very high altitudes.

By successful completion of this exhaustive test program in record time, the F3H Demon and Allison J71 clearly demonstrated the qualities of reliability and dependability required of all new equipment before entering fleet service. Already established as the fastest all-weather Navy fighter now in service, the Allison-powered Demon thus becomes a valued and respected addition to the air arm of the U.S. Fleet.

ALLISON DIVISION OF GENERAL MOTORS, Indianapolis, Indiana

AMERICAN BUILT FOR THE JET ERA IN AIR TRAVEL

Production Spotlight

• Reaction Motors, Inc. has completed its million-pound-thrust rocket engine test stand at Denville, N. J. Twenty liquid propellant rocket test stands are now operational at the company's new $4,500,000 New Jersey facility.

• Orders for the Bristol Britannia now total 55 as result of RAF Transport Command increasing its order from six to 10 aircraft. Nine production Britannias have flown, five of BOAC's 33 have been delivered.

• North American Aviation is making an extensive study of the British Decca navigation system as a means of getting more accurate data during high-speed trials with new aircraft.

• Unusual test of fire resistance of Monsanto's Skydrol hydraulic fluid occurred during recent takeoff roll of an airline Douglas DC-6B. As plane started its takeoff, all engines quit. A subsequent check showed water-injection system had been serviced with Skydrol.

• Russia is making a strong bid for foreign sales of its Tupolev Tu-104 twin-jet transport. A price of $1.2 million is being quoted. Delivery is promised for 1958.

• German engineers are working on two lightweight fighter designs for the Spanish aircraft industry. Both will use the Bristol Orpheus turbojet. Willy Messerschmitt is designing one model for La Hispano Aviacion, while Heinkel is working on a contract from Construcciones Aeronauticas.

• Air Transport Assn. engineers are negotiating with Ramo-Wooldridge Corp. for development of an airline airborne collision warning device. Big problem is to iron out how project will be financed, with costs estimated at about $750,000.

• Vickers Valiant is to be fitted with De Havilland Sprite rockets, one under each wing. More advanced DH Spectre rocket is due to be flight-tested this year. It will be used in fighters with combination turbojet/rocket power.

• Atomic frequency standards to replace usual high-precision crystal standards in the 2,000-mi. Navarho long-range rho-theta system are under development at Rome Air Development Center. Airborne and ground atomic counters would improve Navarho performance greatly and would be considered for bombing and short-range navigation systems.

• Japanese government orders for 110 license-built F-86Fs from Shin Mitsubishi and 83 T-33As from Kawasaki are expected to be filled by June 1958. Preliminary discussions on Japan's F-86 replacement are under way, with F-100 and F-104 the chief contenders.

• Although official Army contract probably won't be forthcoming until after July 1, sites for the Decca navigation system installation in the New York metropolitan area already are being surveyed. Project will be under Air Navigation Development Board supervision to evaluate the British system as a helicopter navaid, with New York Airways' S-55 operation as the yardstick. Master station is slated for Yorktown Heights, N. Y., with "slaves" at Yaphank, L. I., Newton, N. J., and a third in Connecticut.

• Marquardt Aircraft Co. is participating, along with Olin Mathieson Chemical Corp. and Reaction Motors, Inc. in an advanced R&D program for supersonic propulsion. Called project Omar, it includes development of advanced ramjet and rocket engine designs, and improved fuels and propellants.

ONE *of the*
advanced engineering features
assuring high reliability in

COLLINS WEATHER RADAR

This component in the RT unit of Collins WP-101 Airborne Weather Radar System is a *load* isolator. Its function is to allow the magnetron to operate into transmission lines having less critical characteristics which otherwise must be corrected by complicated line tuning.

The load isolator also protects the magnetron from high VSWR conditions caused by accidental damage to the wave-guide. Generally this damage is detected only by a series of successive magnetron failures — an expensive procedure in both time and money. It all adds up to an extra measure of reliability engineered into Collins Weather Radar System.

There are many other advanced engineering features in the WP-101 system, including: simplified circuitry; printed wiring, which connects *and* supports components, adding strength without weight penalty; reduced tube count; modular construction throughout, for maximum serviceability.

For complete information, write for Collins WP-101 brochure.

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AIRTRENDS

LOOK FOR A HOT SENATE FIGHT over the stepped-up bomber-tanker and base construction program proposed last week by Gen. Curtis LeMay. The SAC commander pushed his case at a secret session of a Senate appropriations subcommittee.

Democrats are sure to push for bigger airpower outlays than those requested by the Administration. They'll most likely be supported by recommendations from the Symington airpower study group. Republicans will fight the move; it would play havoc with Administration's hopes for a balanced budget next fiscal year.

Even if LeMay's program were adopted by the Democratic majority, there's no guarantee it would be followed by the Administration. Last year Defense Secretary Wilson impounded funds voted the Marine Corps to prevent a personnel cut. The cut went through as planned.

●

MORE BITTER PUBLIC WRANGLING between USAF and Army may be touched off soon. Reason: Sen. Dennis Chavez (D.-N.M.) thinks USAF-Navy Talos anti-aircraft missile is better than Army's Nike. And he heads a Senate Appropriations subcommittee that wants to cut off Nike funds and concentrate on Talos.

Opening gun in the dispute may have been fired last week by Gen. Maxwell Taylor, Army Chief of Staff. He flatly disavowed Chavez' statement that Army now agrees that Talos is a superior weapon. "Personally, I am of the opposite opinion," said Taylor.

Before cutting Nike funds, Chavez' subcommittee would like to see a realistic test of the two weapons in action. But the Pentagon is very reluctant to stage such a test.

●

LATEST HORSETRADE PROPOSED BY USAF: it will turn over control of helicopter research, development and production to the Army (AMERICAN AVIATION, June 4). But, USAF told the Joint Chiefs of Staff, Army must agree to drop plans to get into the high-speed aerial reconnaissance field.

USAF is primarily interested in high-performance fixed-wing aircraft. It would feel little pain in giving up control of helicopters. But strategy goes deeper. Airmen are convinced Army is trying to duplicate their transport functions with plans for 48 helicopter battalions. They figure this expensive program will get the Defense Department axe in the next few years and that Army will be told to rely more on USAF transport.

●

CONVAIR'S B-58 SUPERSONIC BOMBER, though planned several years ago, still represents about as much of an advance now deemed possible in aircraft performance. Top USAF research officials draw this conclusion from the designs submitted in the recent Phase I competitions for a long-range interceptor, fighter-bomber, and tactical bomber. They weren't radically different from the B-58.

LRI and fighter-bomber were dropped by USAF because the proposed systems were large, heavy and complex. It was felt, for example, that a three-hour ground check would be needed to determine whether all the electronic systems packed into the LRI were functioning. Also, possibility of mission abort was too high to go through with the program.

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Tubeless to save weight, dimpled for more landings—B. F. Goodrich Tubeless Tires mean greater payloads—120 pounds for one airline. Save time and money in warehousing by eliminating the tube. The BFG Dimpled tread wears slower, more evenly, gives more landings before recapping.

Lands big ones safely—BFG wheels, load-rated 60,000 lbs., give maximum strength with minimum weight on Boeing's B-47. What's more, this wheel stood up under test loads of 300,000 lbs.! B-47's dual wheel assemblies are equipped with B. F. Goodrich brakes.

B. F. Goodrich brakes stop Northwest's new 1049-Gs smoothly, give long maintenance with more even wear. When fluid pressure is introduced, a full circle "tube" lifts each brake block evenly around the full circle of the drum. The entire braking surface is utilized.

BFG Rivnuts give Tiger a longer leap Grumman engineers form integral wing tanks of F11F-1 Tiger with top and bottom aluminum wing sections fastened together by new B. F. Goodrich Seal-Head Rivnuts—only one-piece blind fastener with threads. Fuel-tight Rivnut is approved for primary structures.

Heated girdle gives life-saving hug B. F. Goodrich electrically heated rubber is one of the most efficient ways of applying spot heat. It's light, flexible, has many applications. Here it fits snugly over oil valve to maintain vital flow of lubricating oil despite low temperatures.

B. F. Goodrich de-icers break the ice faster—Chordwise pneumatic De-Icers on Lockheed Super Connies have smaller tubes, electronic controls, quick-snap inflation cycles. For more information on these and other products, write: *Aeronautical Sales, B. F. Goodrich Tire and Equipment Company, a Division of The B. F. Goodrich Company, Akron, Ohio.*

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WHILE CONGRESS FRETS AND PENTAGON WRANGLES

Reds Move Ahead with Sub-Launched IRBMs

By ERIK BERGAUST

Revelation by Assistant Secretary of Navy for Air James H. Smith, Jr., that the Jupiter intermediate range ballistic missile will be designed to fire from both surface ships and submarines surprised many experts in this country, but it's old hat to the Russians—they already have such a missile.

Smith's statement came as a surprise to rocket and missile people inasmuch as the Jupiter has been referred to as a giant missile with thermonuclear possibilities.

Navy, characteristically, has no comments to offer on how a submarine could transport a missile such as the Jupiter in submersed position, not to speak of what kind of handling, refueling and launching techniques would be employed.

• **Nevertheless,** the Russians have licked these problems. As a matter of fact, the Germans licked them during the last war—and since the Russians took over Germany's Peenemünde with all its gear and hardware, they could resume production of a fabulous weapons system: submersible ballistic missile launchers. With her 400 submarines and this new concept in IRBM warfare Russia has a striking power that will be difficult to match.

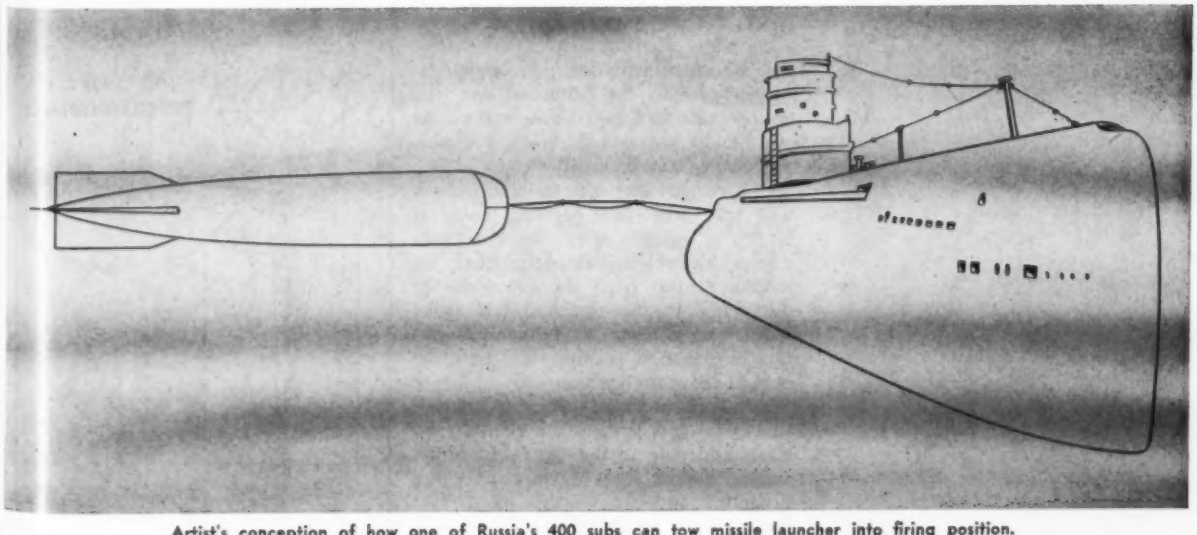
Dr. Walter R. Dornberger, former Peenemünde Commandant, brought this concept to the attention of Defense Department officials several years ago, reporting that submersible missile launching platforms to be towed by submarines had been developed by the Germans at Peenemünde. Despite the fact technical reports on these developments were brought to this country a long time ago, no United States project of similar character is known to have been attempted. And many high-ranking officials are still baffled by the problem of how to transport IRBMs submersed and launch them off an enemy's coast.

• **The Russians,** in fact, are capable of towing hugh ballistic rockets 50 feet high in submersible containers to areas hundreds of miles off our coasts. The containers are about 115 feet long with a volume of 14,000 cubic feet. From different locations their missiles could be launched simultaneously against targets on the mainland. With a range of 1,500 miles—or less—the Red missiles literally could be used against any significant target on the American continent.

Furthermore, this potentiality exists today; the Russians do not necessarily have to wait for completion of their ICBMs to obtain the equivalent firepower. Dr. Dornberger has said that he believes the Russians "emphasis on underwater vessels indicates a plan to use submarines offensively, in American waters, quite possibly as tow vessels for missile launchers."

• **Three slightly different** missile-launchers were built by the Germans, and they were all taken over by the Russians, who have had 11 years to complete this weapons system—which, incidentally, was almost perfected by the Peenemünde engineers at the end of the war. The launchers, now believed to be mass-produced by the Russians, were first suggested in early 1944 by Dr. Dickmann of the famous Vulkan Werft (Vulcan Works) in Stettin.

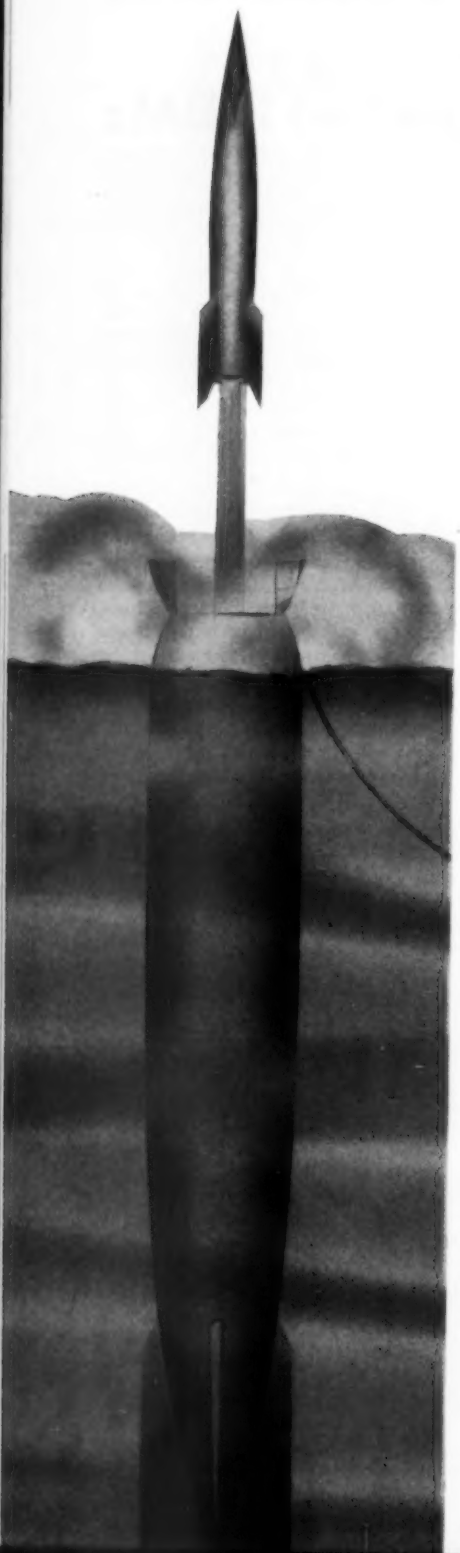
Developed in the greatest of secrecy under the code names *Project Swim Vest* and *Project Test Stand 12,* Peenemünde's top scientists, led by Dr. Wern-



Artist's conception of how one of Russia's 400 subs can tow missile launcher into firing position.
Sketches by William Martin from original German blueprints.

her von Braun, were working on the missile launchers.

Designed for V-2 missiles, the submersible launching platforms were fitted with a control station, tanks for liquid oxygen and alcohol, water ballast tanks and a gyro system to counteract yaw and roll under towing as well as when the launcher was in upright position for firing the missile from its inside. The net weight of the launcher was 70 tons; the missile, its propellants and accessories represented 35 tons. Ballast amounted to 300 tons.



Missile zooms aloft from inside 115 ft. container. Exhaust gases are vented to the atmosphere through funnels.

Three launching containers could be towed in submersed position by one submarine at 15 mph. One launcher could be towed at 20 mph. The range was limited only by the fuel supply of the submarine. With specially designed vacuum-insulated tanks the loss of liquid oxygen during transportation was kept as low as 1%.

• **A series of problems** and difficulties were experienced by the Peenemünde engineers during the first tests. In particular, the greatest problem was to keep the launcher stable under transport as well as under firing of the missile. Large rudders activated by the gyro-servo system were used to obtain stability during horizontal operations. Certain hazards were connected with the excessive amount of hot steam that was formed during firing.

The rocket exhaust escaped through funnels, but the terrific heat from the gases caused the water in some of the ballast tanks to boil, forming steam which had to be vented to the atmosphere. Vent systems for propellant fumes also were incorporated to minimize the explosion hazards.

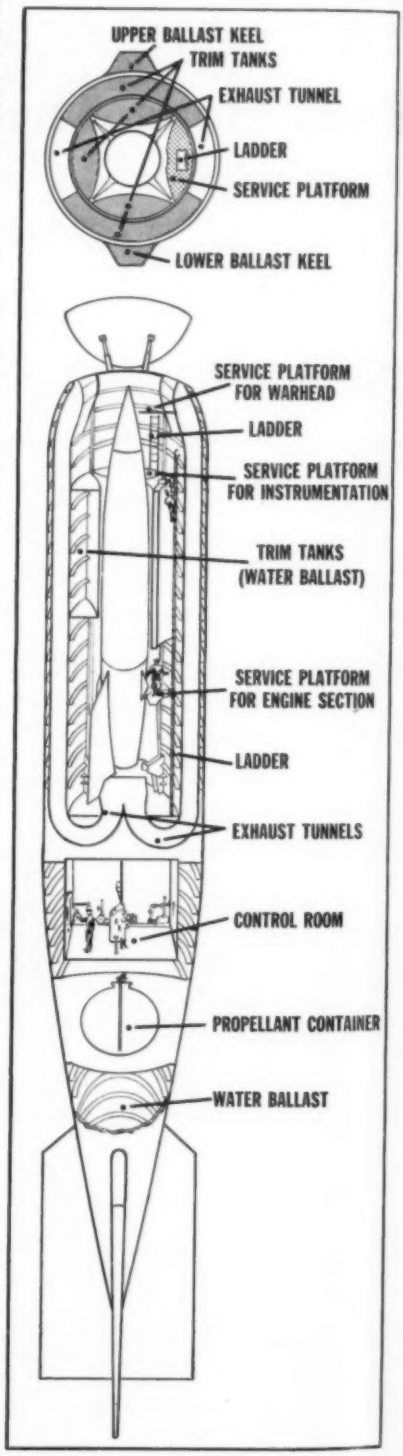
• **It took the Germans**—on a wartime crash program basis—only two years to develop the missile launchers, and it seems obvious that the Russians, who took over the equipment, have been able to solve whatever problems the Germans did not have time to solve.

Design criteria for the submarine launchers include an intricate pumping system for the water ballast, as well as a complex electrical system for operation of instrumentation, gyros, pumps, lighting inside the launcher and for testing prior to firing. Three technicians can handle the launching of a liquid-propellant ballistic missile.

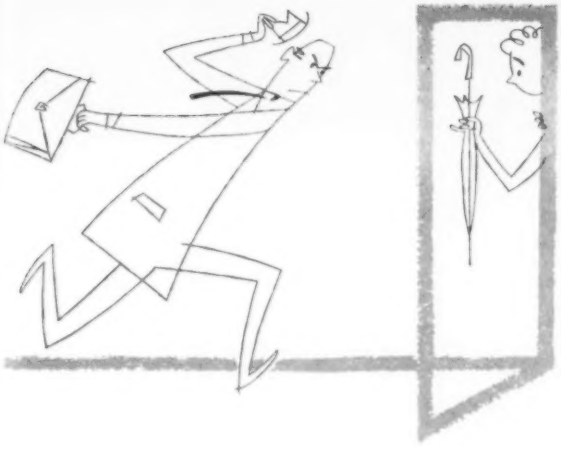
A conservative estimate indicates it will take less than half an hour to launch a missile after the tow submarine has reached its destination. By remote control from the sub some of the water in the upper ballast tanks will be pumped out, the launcher slowly tilts into vertical position, and only the nose is above the surface.

The technicians, entering from a rubber boat, will open the clam-shaped doors and plug in the electrical connection. A ladder leads down to working platforms and the control room. Gas fumes will be vented to the atmosphere, electrical motors started, and the missile activated and pressurized for fueling and launching.

The technicians will leave the launcher after proper testing of instrumentation and setting of the warhead fuse and guidance. The fire control is handled from inside the submarine. The launcher may be abandoned, or, if cir-



Cross-sectional view of missile launcher.



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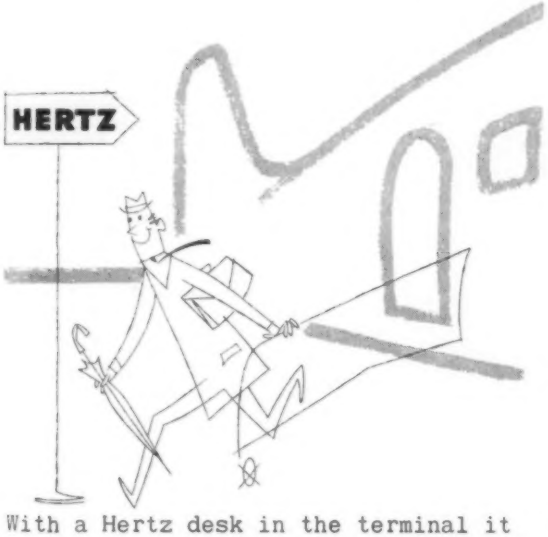

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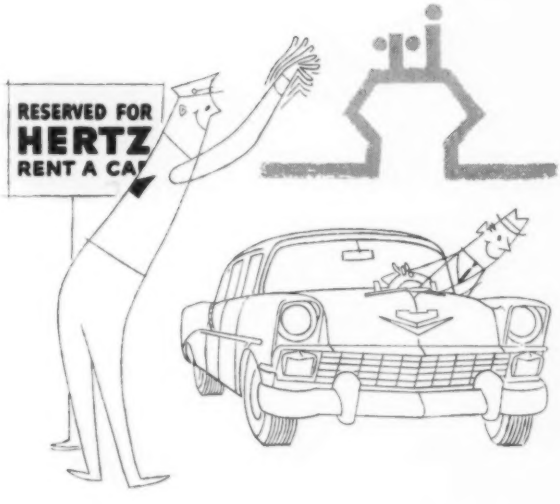

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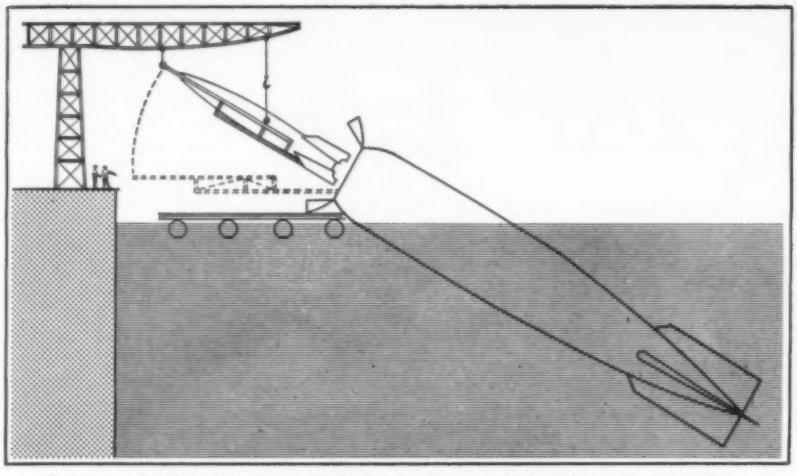


Technique developed at Peenemünde for loading missile launcher with V-2 rocket.

cumstances permit, it may be towed back to base or a mother ship and be made ready for use again.

• **The range** of a V-2 missile, when launched from a submersible launcher, was considerably reduced because of the back pressure caused by reversing the rocket exhaust 180° through funnels.

However, with improved rocket engines and lighter components, it is permissible to assume that a modern IRBM-type missile designed for a 1,500 mile flight will be capable of covering at least 75%—or about 1,200 miles, when fired from a submarine launcher. Significance of this launching method is that the missile may be transported undetected.

Other advantages include the shorter duration of flight, versus missiles being launched from sites much farther away; the mobility offered through the use of the submarine is perhaps most important. ◈◈◈

WILSON CLAMPS LID DOWN

Military Chiefs Avoid Controversies In Speeches Before Aviation Writers

By ROBERT M. LOEBELSON

SAN FRANCISCO—It became completely evident at the Aviation Writers Association convention that Defense Secretary Charles E. Wilson has put the lid on military controversies in speeches by flag officers of the three services. The action is the result of recently leaked documents to the press by Army and Air Force officers.

Although AWA heard from such high-ranking military officials as AF Vice Chief Thomas D. White, SAC Commander Curtis E. LeMay, Rear Adm. William A. Schoech, Deputy Bureau of Aeronautics Chief for Research and Development, AF Maj. Gen. Patrick Timberlake of TAC's Ninth Air Force, Brig. Gen. Carl I. Hutton, head of the Army Aviation School, and others, not a single talk could be considered in any way controversial. Some of the speeches, however, provided plenty of food for thought.

• **Gen. White,** addressing the AWA banquet, indicated the AF is willing to see the creation of a single armed service, with all personnel wearing the same uniform, if that would serve to bring an end to interservice rivalry.

• **Gen. LeMay,** fresh from recent testimony before Sen. Stuart Symington's airpower investigating group in which he iterated the need for more long-range bombers and jet tankers, touched on less sensitive ground when he appealed to AWA members for support of better pay and living conditions for skilled SAC personnel.

• **Adm. Schoech** told of a recent warning (probably more than half-true) by Navy Secretary Charles S. Thomas that any Navy flag officer popping off on controversial matters would find his services required in the Arctic and Antarctic ocean areas.

• **Gen. Timberlake** described TAC's expansion of activity to the point where it could now deliver atomic and thermonuclear weapons by the use of in-flight refueling, thereby augmenting SAC's strategic bombing.

• **Gen. Hutton,** while indicating that the Army is not competing with the USAF in its desire to fly lightplanes and helicopters, nevertheless commented that the AF has no "divine right" to the use of aircraft.

'All the Facts'

He conceded that some Army officials are pushing for the establishment of an Army Aviation Branch—completely separate from the infantry, artillery, etc.—but added that such an organization would also have no divine right to fly Army planes. Lightplanes and helicopters must be organically integrated into various Army branches, he said.

Hutton expressed the belief that President Eisenhower's 10-year-old statement to the effect that the Army belongs on the ground would not be repeated by Mr. Eisenhower now if the Chief Executive were in a position to be aware of all the facts.

(Such an implication, i.e., that the President is not being kept fully informed on aviation matters, may be taken up by Sen. Symington and other Democrats critical of national defense policies as evidence of their charges.)

Other Highlights

During the week-long convention, AWA members also:

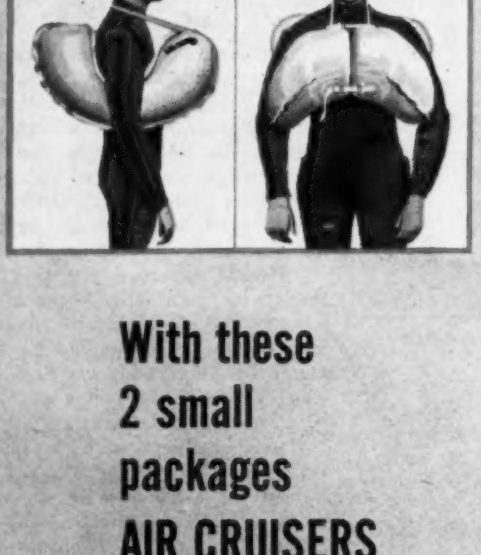
• Heard Air Transport Association president Stuart G. Tipton warn that the Russians are preparing to compete with the airlines of the Western nations.

• Visited Castle AFB, Merced, Calif., where the first B-52 heavy bomber wing will soon be fully operational, for a demonstration of some of the newer and hotter AF planes. Included were supersonic passes by the F-100, F-101 and F-102, flybys of the B-66, B-47 and B-52 and a simulated refueling of a B-52 from a KC-97.

• Saw ground displays and flights of new Navy aircraft at Moffett Field. Included were the A3D, F4D, A4D, F8U, FJ-3, F7U-3 and others. They were also told that the F5D, an improved version of the F4D Skyray, had made its first flight at Edwards AFB.

• Were informed that NACA's Ames Aeronautical Laboratory is now using a Mach 20 gas-gun to help solve the reentry problem of the IRBM and ICBM. A later version of the gas-gun, now being built, will be capable of providing data on Mach 30 research speeds.

• Elected David R. Wallin of the St. Louis Post Dispatch to succeed the AP's Vern Haugland as president. Vice presidents are George Rhodes of the San Francisco Call-Bulletin, Roy Kervin of the Montreal Gazette and Charles Thobaben of Central Press Association, Cleveland. Next year's convention site will be St. Louis. ◈◈◈



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Prospects Good for More Defense Spending

Senate boosts NACA 1957 Appropriation $5 million; Mutual Security Program picks up support.

By FRANCIS J. KEENAN

Once more, as Congress moved into the heat of June and the big bills moved from the House to the Senate, prospects brightened on several fronts for some increases in defense spending.

Last week:

• **The Senate** was boosting NACA appropriations by about $5 million over House totals for fiscal 1957.

• **The Mutual Security Program,** in serious trouble in the House, was picking up support for Senate restoration of the $1.1-billion reduction recommended by the House Foreign Affairs Committee.

As the bill reached the House floor, Democratic and Republican leaders had agreed to back a Presidential compromise figure of $4.4 billion, still $500 million below the Administration's estimate.

• **The Senate** Defense Appropriations Subcommittee was nearing the end of its detailed study of the fiscal 1957 defense budget, amid predictions by Chairman Dennis Chavez and others that between $1 billion and $2 billion would be added to the AF's $15.8 billion estimates.

Symington Probe Nears End

• **Sen. Stuart Symington (D. Mo.),** back in Washington as the front-running Democratic darkhorse after enthusiastic endorsement by the Missouri State Democratic Convention as his party's Presidential nominee, was systematically moving his airpower study toward its conclusion, probably within two weeks.

• **ADC Commanding General** Earle Partridge's closed-door testimony was released by the Symington Subcommittee, confirming his open-door emphasis on the need for better fighter interceptors, more bases, personnel, and better radar and communications facilities.

This program, he repeated, should cost $61 billion by 1965, with the heavy expenditures coming up shortly.

Officially, Administration spokesmen reiterated the 1957 defense budget line at every opportunity: (a) it's austere, but (b) it's adequate, if (c) Congress is prepared to come through in 1958 and later with substantially heavier spending programs.

The austere nature of the Administration's defense program was reflected in its tenacious fight to save its $4.9 billion foreign aid bill. Emphasizing that military aid, about $3 billion of the total request, is an integral part of overall U.S. defense spending, the Executive Branch threw its top brass into the Congressional breach, topped by retiring NATO Commander Gen. Alfred Gruenther, whom Senators found the most convincing advocate of full-scale aid.

Administration Bothered

What bothered the Administration most, however, was the recommendation of the House Foreign Affairs Committee that only $460 million of military aid should go to European countries. This, they contended, would not take care of even one of the two big elements of the program: (a) the $530-million advanced weapons program that stresses new jet aircraft, missiles and electronics equipment; and (b) replacement and repair of military equipment already there.

• **Meanwhile,** Sen. Symington aimed his investigation toward a closing date very close to the Senate's scheduled consideration of the defense budget. It was clear that Symington's emphasis, despite his announced extension of the inquiry to cover the roles and missions of the services, was still being placed on the "adequacy" of U.S. airpower vis-a-vis that of the Soviet Union.

Symington's extemporaneous blast at what he termed the Administration's goal of a "second best Air Force" indicated clearly, however, he saw "adequacy" in terms of quantity and quality of planes, missiles and equipment—in brief, defense spending. ◈◈◈

Military Procurement Hits High for 1956

March obligations for aircraft and related equipment by the military services totaled $1,943,643,000—the heaviest procurement rate for any month of Fiscal 1956.

The March procurement volume brought cumulative aircraft obligations for the first three quarters of the fiscal year to $4,127,935,000, or a little more than half the $7,989,000,000 obligation target set by the Pentagon for Fiscal 1956 as a whole.

Military spending for aircraft and related equipment during the nine-month period totaled $5,234,819,000.

The Defense Dept. obligated $239,-108,000 for guided missiles during March, bringing its total cumulative procurement for the July-March period to $1,041,952,000. On the spending side, it appeared certain the Pentagon would top $1 billion this year for the first time in the history of guided missile procurement. With three months left to go, the services had paid out $829,665,000 for missiles, including $107,903,000 in March.

Turboprop-Powered C-133A Logs 30 Hours

Air Force's new logistics carrier, the four-turboprop Douglas C-133A, flew 10 times and logged 30 hours flying time during the first month after its first flight April 23. C-133A, powered by four Pratt & Whitney T34-P-3 engines of 5,700 shp each, has lifted its design gross weight of 255,000 lbs. during its initial test phase.

HOUSE SUBCOMMITTEE HEARS . . .

Why Small Defense Industries Are Unhappy

By FRED HUNTER

LOS ANGELES—Examples of how small business firms are contributing effectively to the national defense program were related at a two-day hearing held here by the Military Procurement subcommittee of the House Small Business Committee.

The event also gave representatives of small business an opportunity to air —or re-air—some of their grievances. Four major problems in defense subcontracting submitted to the congressional committee were these:

- Inequities in the government-furnished facility program.
- Harmful effects of renegotiation.
- Need for revision of the small corporate tax structure.
- Need for a better progress payment policy.

"We do not require any encouragement to deal with small firms," Rulon Nagely, director of material for North American Aviation, told the subcommittee. "They are vital to the success of our operations."

Nagely pointed out that North American last year purchased $275 million worth of goods and services from small business firms (under 500 employes) "Small business received approximately 54% of our direct orders by value," he said.

Inconsistencies Scored

• **John Marschalk,** executive director of the Small Defense Industries Assn., urged the committee to take note of the inconsistencies in the government's facilities program.

Currently, one company may obtain a large amount of equipment from the government for free, another may pay 1% rent and still another 2%. "What qualities of virtue are required to permit one company a better break than another at the hands of a government which is supposed to give equal blessing to all?" Marschalk asked in a statement in behalf of SDIA.

One illustration of the competition of government facilities cited was that of furnishing of 1,595 items of plating equipment worth $6,687,442 by the Air Force to 68 manufacturers of airplanes and parts. Plating and metal finishing were described as a typical field of activity for small business.

The SDIA, which comprises 92 firms in the small business category devoting their activities mainly to defense subcontracting, urges that all government facilities be put on an equal basis for all contractors at costs comparable to private ownership.

• **Renegotiation** is taking the incentive away from small firms to aid in the defense effort, E. H. Twarowski, Jr. of the Double-T Products Co. of Hawthorne, Calif., told the committee. He cited figures to show how his firm "lost its shirt" in renegotiation of 1951 business. The renegotiation, he said, took place in 1954 and cut the firm's profit from $68,000 to $30,000.

"We made our profit by our ingenuity in production and by using new machine processes," Twarowski said. The renegotiation destroyed the opportunity for his firm to buy more equipment, he added. In the long run renegotiation costs the government far more than it gets in return, he said.

Efficiency Penalized?

Marschalk, for the SDIA, also attacked renegotiation as having a negative effect on subcontracting. It accomplishes nothing toward protection of the public purse because contracts are obtained only under conditions of extreme competition, he said.

"What does happen, however, is that efficiency is penalized," said Marschalk. Having underbid his competitors, the small firm which exercises unusual ingenuity so that something more than the determinable allowable profit percentage has resulted, is now called upon to pay back to the government the fruits of his economies."

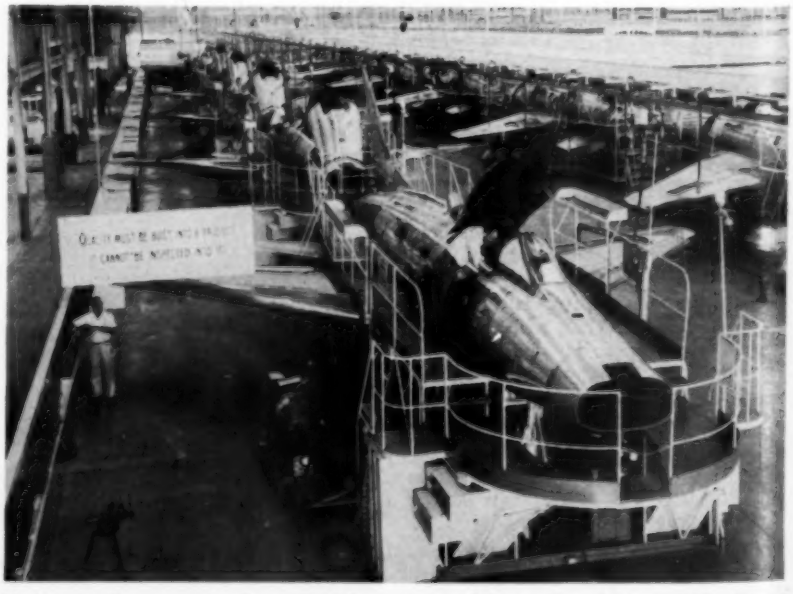
• **In asking for support** for early revision of the small corporate tax structure, the SDIA urged the committee to consider HR 9851, the Seely-Brown bill, which has the association's endorsement.

C. G. Hokanson, Los Angeles, subcontractor, reported on the difficulties small firms experience on progress payments.

"The major companies get these progress payments and are able to buy material which later may have to be discarded because of redesigning of parts, but the government agencies have been adamant in refusing subcontractors any progress payments," said Hokanson. "This forces a hardship on the small business firm and I know of six in this area who have gone into bankruptcy from this cause in the past year."

In emphasizing how small business firms often offer lower cost, greater flexibility and more ingenuity in the solution of design and procurement problems, North American Aviation's director of material, Nagely cited three out-

Super Sabres on Final Assembly



Moving cradles carry Air Force F-100C supersonic fighters down final assembly line at North American Aviation's Los Angeles plant. Lead plane in photo is tagged No. 140.

standing examples. Topping the list was the story of Servomechanisms' development of the computer for the F-86 in Korea.

• **Servomechanisms** was in the small business category when it took on this job on a very small development contract from North American. "Like so many other small businesses that do a good job with respect to quality, delivery and price, this company has now grown out of the small business category," said Nalon. "We buy various computers and electronic devices from them and, altogether, have placed about $25,000,000 worth of business with the firm."

Nagely noted that in producing the computer, Servomechanisms has reduced its price from about $2,800 to $1,400 per unit.

NAA Helped Small Firms

Nagely also cited examples of the unusual lengths to which North American goes to lend assistance to small business firms it felt were doing a good job. Although he did not mention the companies by name at the hearing, Nagely described how North American advanced $35,000 to one company (Sweeney Engineering Corp.) to help finance an initial order on hydraulic units for the F-100 and $200,000 to another concern (Hoover Electric Co.) to assist in financing its production of electric actuators. Both are now outstanding producers for North American, he said.

• **Other witnesses** appearing before the subcommittee in Los Angeles were D. J. Bosio, director of material for Douglas Aircraft Co., who outlined how Douglas has seven coordinators for small business subcontracts in its purchasing department, and Brig. Gen. Harley S. Jones, deputy director of procurement and production for the Air Materiel Command at Dayton, and Rear Adm. John B. Pearson, chief of the Bureau of Aeronautics' western district, who said both the Air Force and the Navy have programs to insurance participation by small firms in government defense orders.

Gen. Jones said that of $15,500,000,000 in defense purchases and contracting by the Air Force, approximately 21% went to small business firms. Donald McLarnan, regional Small Business Administrator, told of his agency's work in obtaining an average of $1,000,000 per month in military set-asides for smaller firms in the Southern California-Arizona area.

The subcommittee is to report its findings to the full committee in Washington. General conclusion of small business interests on the coast was that the members of the subcommittee, Tom Steed (D) Okla., and James Roosevelt (D) Calif., conducted a constructive and well tempered hearing. ◆ ◆ ◆

Cornell Lab to Make 20-year ATC Forecast

The ticklish job of putting down on paper a list of all civil and military aircraft expected to be in use during the next 20 years has gone to Cornell Aeronautical Laboratory.

Under recent contract awards let by Presidential assistant Edward P. Curtis for long-range aviation facilities studies, CAL will get $85,000 to analyze the characteristics of aircraft now in production, and those being planned, to help set up needs for a future air traffic control system.

Balance of the $300,000 awarded by Curtis goes to Airborne Instruments Laboratory of Mineola, N. Y. and Aeronautical Research Foundation of Boston. AIL will direct and coordinate the complete study; ARF will handle all economic aspects.

Cornell's assignment:

• List aircraft expected to be in use in next 20 years.

• Determine the impact of scientific advances on future aircraft types.

• Set aircraft flight specifications important to ATC.

• Study flight economics to determine what scientific advances can be introduced and used economically in next 20 years.

• Estimate airport and en route traffic.

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Military Needs Still Key to Common System

by LOIS C. PHILMUS

Any doubts that the common system of navigation and air traffic control must encompass military tactical requirements were dispelled in recent weeks. Top civilian and military officials have made it lucidly clear in speeches delivered before the Aviation Writers Association and the Spring Assembly of the Radio Technical Commission for Aeronautics.

Major Gen. Gordon A. Blake, USAF director of communications, warned that "if we forget our tactical needs in equipment, design and systems planning, we force the military into providing equipment which does a duplicating or overlapping function."

He charged that military tactical operations have not received sufficient consideration, adding: "From all indications, future wars will not permit much of a mobilization period. Our common system of the future must, therefore, have a built-in capability to handle any amount or combination of military and civilian traffic at a moment's notice."

While Blake spoke of common system equipment, a high Commerce official spoke of a "great system . . . where all procedures are the same."

• **Commerce Under Secretary Louis S. Rothschild,** who also is chairman of the Air Coordinating Committee, revealed that SWG-13 called for a change of "far-reaching significance from previous policy" dealing with civil/military relationship. "It is now clear," he stated, "that the common system should accommodate military tactical as well as civil and non-tactical military operations."

Rothschild Approach Differs

Rothschild took a slightly different approach than Blake, however. Forgotten occasionally, he declared, is that the basis of the common system is the use of uniform procedures. Wherever possible, he continued, the *objective* in all cases must be a common equipment or a common element. But, he cautioned:

"Sometimes economics prevent this in that the requirements of the military or the airlines may be far too expensive for the general public pilot to meet. Perhaps the elaborate equipment is too heavy or too big, and very often the real problem revolves around that precious commodity, the radio frequency."

"It is always desirable," he said, "but certainly not easily possible to have any one part of our system which fully accommodates all of these varied requirements. The high performance aircraft need expensive and elaborate equipment to do the job. Our citizen flier, on the other hand, needs simple inexpensive yet reliable equipments, for all must fly in the same airspace and in the same common system of airways."

• **Col. J. Francis Taylor,** director of the Air Navigation Development Board, in tracing the development of the Tacan/VOR-DME fracas, found "the fat to be in the fire" when Korea broke. He said this was the turning point when the realization dawned that the common system "no longer was confined to the requirements of the civil and non-tactical military, but rather had to satisfy the requirements of civil and tactical users."

Taylor revealed that when the new ANDB charter was developed in January, 1954, "the new Board realized . . . that the common system had now fully tactical requirements."

What effect the new concept, if fully spelled out two years ago, would have had on the present short-range navigation dilemma is of course unknown, and any speculation would be second-guessing. But that it aimed at a clear-cut Federal policy is obvious.

While ANDB has found no technical blocks to Tacan taking its place in the common system, Taylor said, he acknowledged that the dilemma was

(Continued on next page)

Rocket Sled Attains Speed of 1,000 MPH

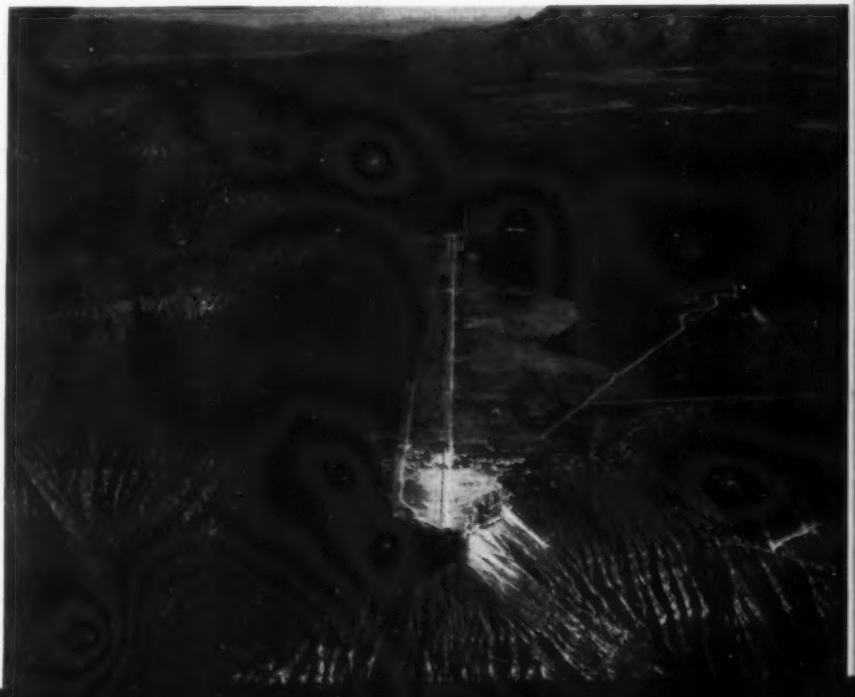
Hurricane Mesa, Utah—Air Force's new $4-million supersonic rocket sled facility here will be used to test downward ejection seats, cockpit capsules and "an entirely new concept of pilot enclosure."

Project Smart (Supersonic Military Air Research Track) already has attained speeds of more than 1,000 mph, with dummy models being ejected out over a thousand-foot deep canyon.

Downward ejection tests will be in cooperation with Lockheed, presumably for the F-104; the capsule will be in collaboration with Republic, probably for the F-105 or XF-103, and the "new concept" is a Convair project, probably related to the XB-58 Hustler supersonic bomber.

Coleman Engineering Co., Los Angeles, built and operates the installation for Wright Air Development Center. Track is 12,000 feet long.

Looking down on Project Smart rocket test sled installation from ejection end.



How Tacan Shapes Up to ANDB

First public recital of the investigation of "uncertainties of Tacan" by Col. J. Francis Taylor, director of ANDB, brought forth the following facts:

- National Bureau of Standards has estimated that 100 channels are needed for system navigation coverage. ANDB claims 104 are available.
- System was designed for 126 channels, with "certain of these" required for "exclusive" military use.
- Airborne Instruments Laboratory (report classified) has reported to ANDB that interference to other systems (obviously the radar beacon) still leave the 104 channels plus exclusive military channels adequate.
- More than 52 channels of Tacan interfere with civil DME if co-existence is to be implemented.
- One year to 18 months was estimated by Taylor for development of airline-type airborne equipment, with more than two years for lightplane development.

far from solved. He declared ACC would "presently" act on the "unresolved unknown" of U.S. air policy while applying Tacan's capacity to the various classes of aviation, by considering finances, timeliness, international implications and security.

The international situation parallels that in the U.S., he pointed out, with NATO forces favoring Tacan, and foreign civil aviation VOR-DME.

Rothschild said RTCA found only one recourse: "to solve a situation such as this—first, in the best interests of the country; second, in a manner which will best meet the operational requirements of all users' groups; and, third, to be economical in so doing."

What the fight has wrought was indicated in a statement of Rothschild's, obviously aimed at ANDB's role in attempts to establish policy. He observed that it "is most important" that ACC, RTCA and ANDB each "take care of its own responsibilities first."

"Let us be careful," he urged, "that each keeps to its own area so that it does its primary job well."

Two New Committees Proposed

One of the stumbling blocks in the Tacan situation was its classified nature, even when it was being proposed for civil use. To offset this, General Blake offered a concrete proposal that probably will be heard of further.

Acknowledging that "the main deterrent" to close civil-military teamwork and planning has been "the bugaboo of security classification," the communications chief proposed the establishing of two committees to "cut the time between compromise and declassification." He called for the formation of a special group in the JCS Joint Communications Electronics Committee and a special security-cleared civil committee. Three objectives of the two committees would be:

- To study new developments to see if they have a potential common use.
- To permit early planning by civil and military interests for common use of those developments which do have potential.
- To promote declassification of equipment as soon as the benefit of classification is outweighed by the nation's need for free civil use of the equipment.

Three further points were made by Blake in furthering the orderly development of the common system:

(1) make allowances for human errors by designing a system which is easy to use and has self-correcting factors which work toward avoiding accidents; (2) provide a broader concept and include a single integrated system for all phases of flight control, navigation and communications; and (3) speed up the incorporation of new developments into the system by more clearly defining what job is to be done.

More specifically, Rothschild revealed that the SWG-13 report, which will be made public "in the very near future," has come to agreement on another change in basic philosophy: that there are certain areas of the common system where the speeds of aircraft and the density of traffic necessitate the use of positive IFR-type control methods in all weather. VFR would some day have to be prohibited in these areas.

Acknowledging the controversial areas of this concept, Rothschild indicated that the strong disagreements of the Aircraft Owners and Pilots Assn. have been compromised.

These statements, coupled with the CAA five-year airway plan and the activities of Special Presidential Assistant Edward Curtis, seem to brighten prospects for a truly common system. ◈◈◈

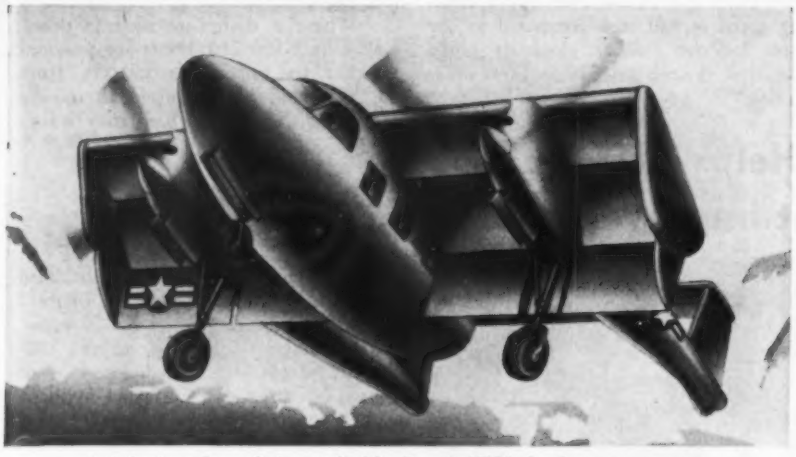
Navy to Re-activate 2 Vessels for IRBM Tests

The U.S. Navy now plans to re-activate two Mariner vessels for IRBM testing (AMERICAN AVIATION, June 4). One vessel will handle communication; the other ship will be used for handling and launching of the *Jupiter* missile itself. From these experiments the Navy hopes to learn what it can do in terms of ship-launching the *Jupiter* in the future. That includes submarine launching. Right now, however, the Navy does not know how to launch the *Jupiter* from a submarine.

Parrish Visits British Aircraft Plants

Wayne W. Parrish, Editor and Publisher of American Aviation Publications, is shown (left) on an inspection tour of Vickers-Armstrongs plants at Weybridge and Hurn during a recent visit to Britain's aircraft industry. He is seen in front of Capital Airlines' 26th Viscount at Hurn, with Lan Caldwell (center), CAP's resident engineer at Vickers, and Charles Gardner, special assistant to George Edwards, head of Vickers-Armstrongs (Aircraft) Ltd.

ice airlines as a "DC-3 replacement," the VTOL would concede a 2,600- turboprops would give it a rate of climb four times that of the F-27 and a cruis- pieces. Largest of the models is two feet high.



Artist's view of one design studied by Ryan in VTOL development program.

Ryan Turboprop-powered Vertiplane Features New Slipstream Principle

By JOSEPH S. MURPHY

Ryan Aeronautical Co. has moved headlong into the competition for the Army's vertical takeoff/landing aircraft business with a contract to build a prototype of its turboprop-powered Vertiplane.

The Ryan contract, totaling $700,000, will be administered for Army by the Office of Naval Research.

• **The Vertiplane,** Ryan officials say, will be best adapted to the medium-speed Army liaison, light passenger and cargo transport roles. Powerplant will be a single turbine engine driving two large-diameter propellers and true VTOL performance will be achieved using the deflected slipstream principle of low-speed control.

This latter feature is supplied by double, retractable flaps which extend far below and to the rear of the wing trailing edge. During takeoff, landing or hovering, these flaps will deflect propeller slipstream 90 degrees downward. For transition to horizontal flight, the flaps will be retracted as the aircraft gains forward speed and the slipstream will then flow horizontally.

Will Fly Backward, Sideways

• **Ryan officials say,** however, that its Vertiplane not only will hover and make full transition to forward flight, but will also fly backward and sideways.

Background for the Army contract award, they add, is the research conducted by the Office of Naval research, National Advisory Committee for Aeronautics and Ryan in advancing deflected-slipstream know-how to the point where a research vehicle can be built.

In this program Ryan discloses it has completed the first tests and studies of this principle for ONR with full-scale equipment.

• **Ryan's award** is the second to be announced for an Army VTOL within a month. Last month (AMERICAN AVIATION, June 4, p. 29) Vertol Aircraft Corp. won an $850,000 Army contract to design and develop a VTOL utilizing a different principle of achieving vertical flight.

Although the Vertol design also uses two propellers powered by a single turbine engine, it differs from the Ryan approach in that VTO performance is accomplished by the tilting wing principle. In this design, the props and wing move as a unit from vertical to horizontal position.

• **Some hint** of Ryan's broadening interest in VTOL activities, beyond that of its Air Force "tail sitter" jet VTO fighter, came several months ago.

During a recent Society of Automotive Engineers aeronautic meeting in New York, Ryan engineers K. S. Coward and E. R. Hinz collaborated on a detailed appraisal of VTOL designs and performance that extended far beyond the scope of a somewhat limited VTO fighter application.

To provide a "better feeling" for the capabilities of VTOL transports, the Ryan engineers compared their version of a 40,100-pound maximum gross VTOL design with the performance of the Douglas DC-3 and the Fokker F-27 (see chart).

Powered by Two T34s

• **The Model VTOL** suggested would have two 6,000 hp turboprop engines (Pratt & Whitney T34s) driving two 19-foot diameter props. It would have a 1,000-mile range in normal flight and could hover with a 5,000-pound payload.

This transport would take off vertically at its 32,900-pound design gross weight with zero wind. In a 10-mph headwind, gross weight could be increased about 8% and payload by more than 50%.

• **Going a step further,** extension of the takeoff run to 500 ft. would allow a 20% jump in gross weight and payload would increase by 140%.

Compared to the F-27, now the Number 1 prospect among local serv-

How VTOL Compares with DC-3 and F-27

Here's how Ryan engineers estimate performance of a medium-range twin-engine VTOL compared with the DC-3 and Fokker F-27:

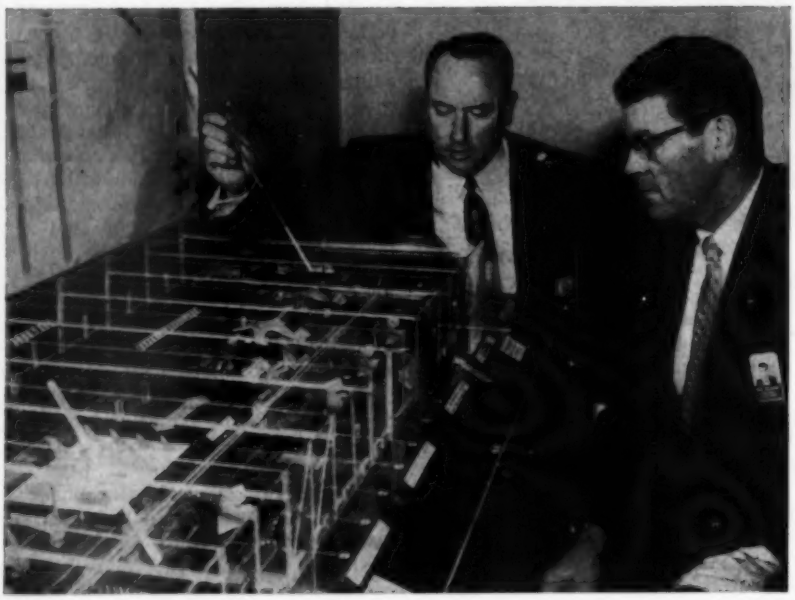
Weights		VTOL	DC-3	F-27
Empty	(lbs.)	21,320	16,865	20,610
Design Gross		32,900	25,200	32,630
Design Payload		5,000	5,000	7,605
Max. Payload		12,200		9,175
Max. Takeoff		40,100		34,200
Max. Landing		32,900		32,630
Engines (2)				
Type		P&W PT2G-3 (T34)	P&W R1830	R-R Dart 511
Takeoff Power (shp, each)		6,000	1,050	1,600—375 lbs. thrust
Performance				
Max. Cruise Speed	(mph)	430 at 20,000 ft.	230 at 8,500 ft.	280 at 20,000 ft.
Rate of Climb (Sea Level)	(fpm)	7,000	1,130	1,640
Range	(stat. mi.)	1,000	1,000	500
Takeoff run (Design Gross)	(ft.)	0	950	2,400

of security classification," the communi-

ice airlines as a "DC-3 replacement," the VTOL would concede a 2,600-pound payload advantage to the F-27 in exchange for its ability to take off vertically.

But at this figure, its two 6,000-hp turboprops would give it a rate of climb four times that of the F-27 and a cruising speed of 430 mph compared to 280 mph for the Fokker. And its range would be double the F-27's—1,000 miles against 500. ◈ ◈ ◈

How Scale-Modeling Helps Vought Make Plant Layout Improvements



Kelly Smith, chief tool engineer, and Dan Gilmore, factory manager, inspect a scale model of the final assembly area of Chance Vought's plant in Dallas. Final assembly of missiles and aircraft is performed in this area, which is 1,200 feet long and 200 feet wide.

Chance Vought Aircraft, Inc., Dallas, has developed an elaborate modeling technique to assist it in planning the design of its production tooling and the layout of its assembly lines.

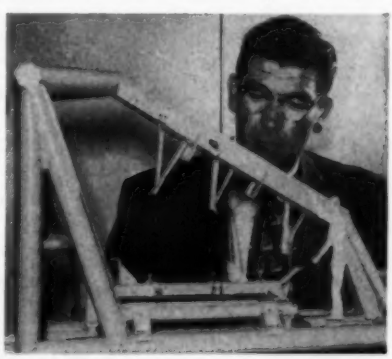
A plastic model in the scale of 1/96th representing the large final assembly area of Chance Vought's plant was built well in advance to show the exact layout of final assembly procedures for the Regulus missile and the F8U-1 carrier-based fighter, now in production.

The model depicts in intricate detail the work tools and fixtures employed in the final assembly stage. It includes miniature people, tow trucks, fire extinguishers, time clocks, materials-handling equipment, coat racks, tool box carts and special dollies for moving subassemblies and engines.

Models also have an important role in the preliminary design of the massive jigs which are spotted along the assembly lines to support wings and other components as they are assembled piece by piece.

• By resorting to scale models made of steel and aluminum tubing, Chance Vought production planners can avoid difficulties and time-consuming delays that would result from a failure to make assemblies and subassemblies fully accessible to workers.

A dozen model jigs were constructed for the F8U, some of which were revised four times before the final form was agreed upon. Built to exact scale, the models were evaluated with tiny work stands and human figures to determine the accessibility of work pieces. Largest of the models is two feet high.



Factory Manager Gilmore examines a scale model of a wing jig designed to hold a wing section in a perpendicular position while it is being assembled.

Where a design revision is necessary, only a few man-hours are required to alter the models—a far cry from the time and cost required to modify the actual jig itself, which may weigh up to 30 tons. ◈ ◈ ◈

Lockheed Abandons Work on KC-X Tanker

Air Force has permitted Lockheed Aircraft Corp. to abandon its Phase I development work on the KC-X supersonic tanker. According to an AF official, the project was dropped about March at the same time the company was allowed to discontinue its Phase I development contract on the long-range interceptor.

Lockheed asked to be relieved of the supersonic tanker project because it felt its engineering talent was already spread too thin on other important projects, such as its atomic aircraft, the Air Force official said. He added that Lockheed executives also felt that the tanker did not have a high priority and offered little chance of an immediate payoff.

Lockheed was given a Phase I contract on its design for a jet tanker submitted last year in competition with Douglas and Boeing. Boeing won the production contract with its KC-135, but Lockheed received a development contract for what former Air Force Secretary Harold Talbott called a "technically advanced tanker of great interest."

Facilities

Convair accepted an offer of the San Diego City Council to sell it 250 acres of city-owned land on Kearny Mesa for the company's $40-million Atlas ballistic missile plant. Price of the land, part of the city's Montgomery Field airport, was set at $775,000.

Lear Inc.'s present $3.6-million expansion program includes construction of a two-story wing to the hangar of Aircraft Engineering Div., Santa Monica, boosting floor space to 200,000-sq. ft.; 14,000-sq. ft. addition to Lear-Romec Div., Elyria, O., and a 170,000-sq. ft. addition to Grand Rapids Div., which produces automatic flight control systems and electro-mechanical products.

Harvill Corp., Los Angeles die casting firm, bought 30 acres in Santa Ana, Calif., and will build a 125,000-sq. ft. plant that will increase production capacity by 70%. Completion is expected in January, 1957.

Texas Instruments Inc. is acquiring Wm. I. Mann Co., Monrovia, Calif., producer of precision optical components used in scientific and military instruments, guided missiles and projection devices.

Hycon Mfg. Co., Pasadena, Calif., has established a camera and instrument division.

Axelson Manufacturing Co. has started construction of a $1-million addition to its aircraft division plant, Montebello, Calif. Building will be used to increase facilities for manufacturing aircraft landing gear and components and to consolidate all aircraft activities.

Northrop Aircraft started construction on a $655,000 engineering test building and will also build an engineering center, engine test cell and cafeteria as part of a long-range program to consolidate facilities on a more efficient basis. Total cost will be $8 million.

3000-VA INVERTER...SIMPLIFIES A-C POWER BOOST FOR AIRLINES!

To fulfill the requirements of commercial airlines for increased electric system capacity, a necessity when installing radar and other special a-c devices, Jack & Heintz has perfected a 3000-volt-ampere inverter, the F45-10.

The 3000-va inverter represents a 20% power boost over inverters now on the market. Through careful design, this 20% increase in output has been accomplished with less than a 2% increase in total weight and with no increase in space requirements.

To simplify maintenance and parts stocking problems, 90% of the parts used in the unit are completely interchangeable with the popular 2500 va—J & H model F45-5.

The new model F45-10 is available, immediately, for replacement installations. Or, existing 2500-va F45-5's may be quickly and easily converted for 3000-va output with a conversion kit. In either case, the additional 500-va increase in output is obtained with a total weight penalty of only one-half pound.

Send for product data bulletin No. 1344 for detailed information on this important Jack & Heintz first. Write Jack & Heintz, Inc., 17633 Broadway, Cleveland 1, Ohio. Export Department: 13 East 40th Street, New York 16, New York.

F45-10 INVERTER
Operating Characteristics

	Single Phase *	Three Phase
Output Rating		
Full Load	3000 va	3000 va
Rated a-c Voltage	115	115
Line Amps	24	15
Nominal Frequency (cps)	400	400
Power Factor	90% Lag to 95% Lead	
Rated Input Voltage — d-c	27½	27½
Input Amperes — d-c (at Rated Voltage)		
No Load	44	44
Full Load	185	185
Over-all Dimensions—Inches		
Length	17 13/16	
Width	7 1/16	
Height	11 13/16	
Weight—Pounds	54	

* Load across terminals BA

JACK & HEINTZ ELECTRIC AIRCRAFT EQUIPMENT

CNAS: New Bendix Navaid Package

'File-drawer' configuration features prototype; space, weight and environment demands tax ingenuity of engineers.

By HENRY P. STEIER

Keeping auxiliary equipment compatible with space and weight efficiencies, current ease-of-maintenance demands, and harsh environments in new aircraft weapons systems is pushing electronics engineering to new limits of refined design.

A supersonic aircraft will carry the civil nagivation aids equipment package that points up new trends in packaging that are in keeping with the concept of integrating electronics with the weapon.

Bendix Radio, division of Bendix Aviation Corp., has developed a prototype CNAS (Civil Navigation Aids System) package, designated ARN-50, to be compatible with conditions in the new aircraft.

CNAS follows the trend toward packaging in "file drawer" configuration. Growing in prominence, this idea calls for dimensioning electronic units so that the package is standard in width, height and depth.

• **Assembly of a number** of functional electronic circuits in a subdivided "drawer" saves space, permits easy removal for servicing and allows shuffling of equipment locations in the electronics cubicles of different aircraft.

The CNAS requirement called for squeezing into one "file drawer" marker beacon, glide slope, VHF navigation and communication receivers.

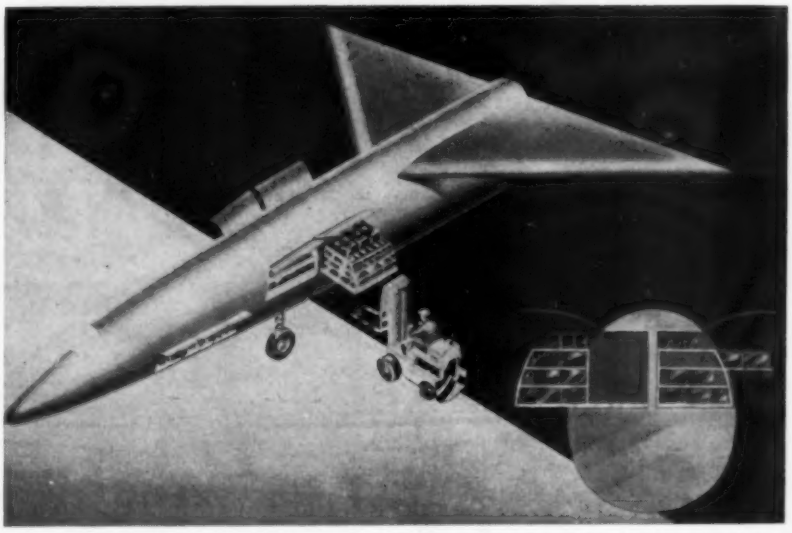
Specifications said top, bottom, rear and side panels of the CNAS enclosure were to be part of the airframe.

Packaging by Function

Bendix decided to divide the package according to function. It was decided four sub-chassis divisions would be the maximum necessary to promote ease of maintenance and yet maintain connector reliability and alignment problems to a minimum.

Glide slope and marker receivers were put on separate sub-chassis. VOR navigation and VHF communication functions were split into two sub-chassis that separated functions by combining on one sub-chassis, RF-IF-Audio and omnirange and localizer circuits on the other.

To hold these units a frame with a front panel was provided. Fuses, interconnecting cables, power relay and the antenna switch were mounted on the frame. Automatic electrical disconnects were provided for each sub-chassis. Each sub-chassis and the main frame has a miniature connector to which all electrical test points are terminated.



Artist's concept of how electronics gear might be packaged and housed in multiple-level drawers in future aircraft. Sliding out on collapsible tracks, the equipment could easily be removed for electronics servicing. Units could be removed in single drawer units or entirely, as shown by cross section diagram of fuselage.

• **A special test meter,** designed for use with CNAS, plugs into these connectors for rapid isolation of trouble spots. Contributing to safety, a design feature provides operation such that if one receiver fails, the functions supplied by the others are not affected.

A tough problem in glide slope-localizer combinations is interaction, and to make matters worse CNAS called for a marker beacon receiver to be added.

To get around the problem, the number of IF frequencies and oscillators were kept to a minimum. Also, stages in each receiver that generated, or were susceptible to, unwanted signals were isolated from non-critical audio and control circuits.

This meant reducing the number of leads exposed to rf energy or capable of introducing unwanted signals. The reduced number of leads made it practical to do effective filtering without serious weight or space losses. Bendix says their tests on the engineering model of CNAS showed no discernible interaction between receivers.

Transistors were ruled out by reason of their frequency and temperature limitations.

Designing electronic equipment to be efficient heat transfer apparatus is a "must" today. Ram air cooling has reached its limits. The temperature of such air at supersonic speeds can exceed allowable component temperature in advanced aircraft designs, and refrigerated air is required.

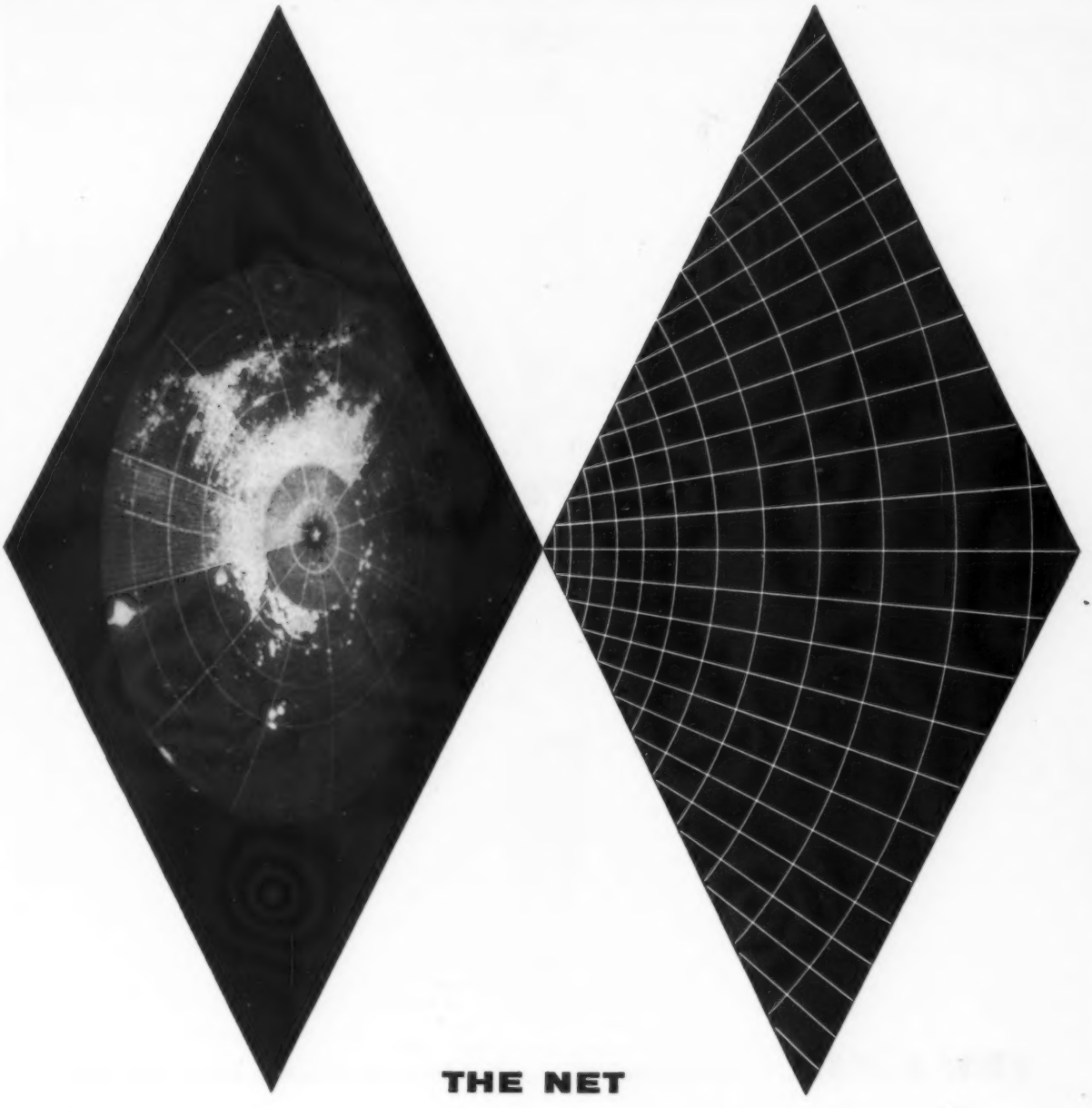
Engine power bled off for operating cooling equipment must be kept to a minimum. Power used for cooling has an important effect on aircraft range. Both the pilot and his equipment are being asked to operate at the highest temperatures possible.

To overcome this penalty a premium is put on cooling air. A minimum airflow is sought and the problem is shifted to the electronics designer to make the best use of what he can get in the way of cooling.

In the case of CNAS, the designers were faced with an imposing specification. It said the "design air flow" maximum was that for which any inlet air condition resulted in an exhaust air temperature of 250°F.

• **This meant** putting the most heat possible into the "cooling air" which actually is to be at about 100°F when

(Continued on page 43)



THE NET

America's most potent protective weapon has been announced by the Army.

It is the new Martin Missile Master, the country's first electronic system designed to coordinate and control an integrated network of radar surveillance, target detection and anti-aircraft missile battery operation.

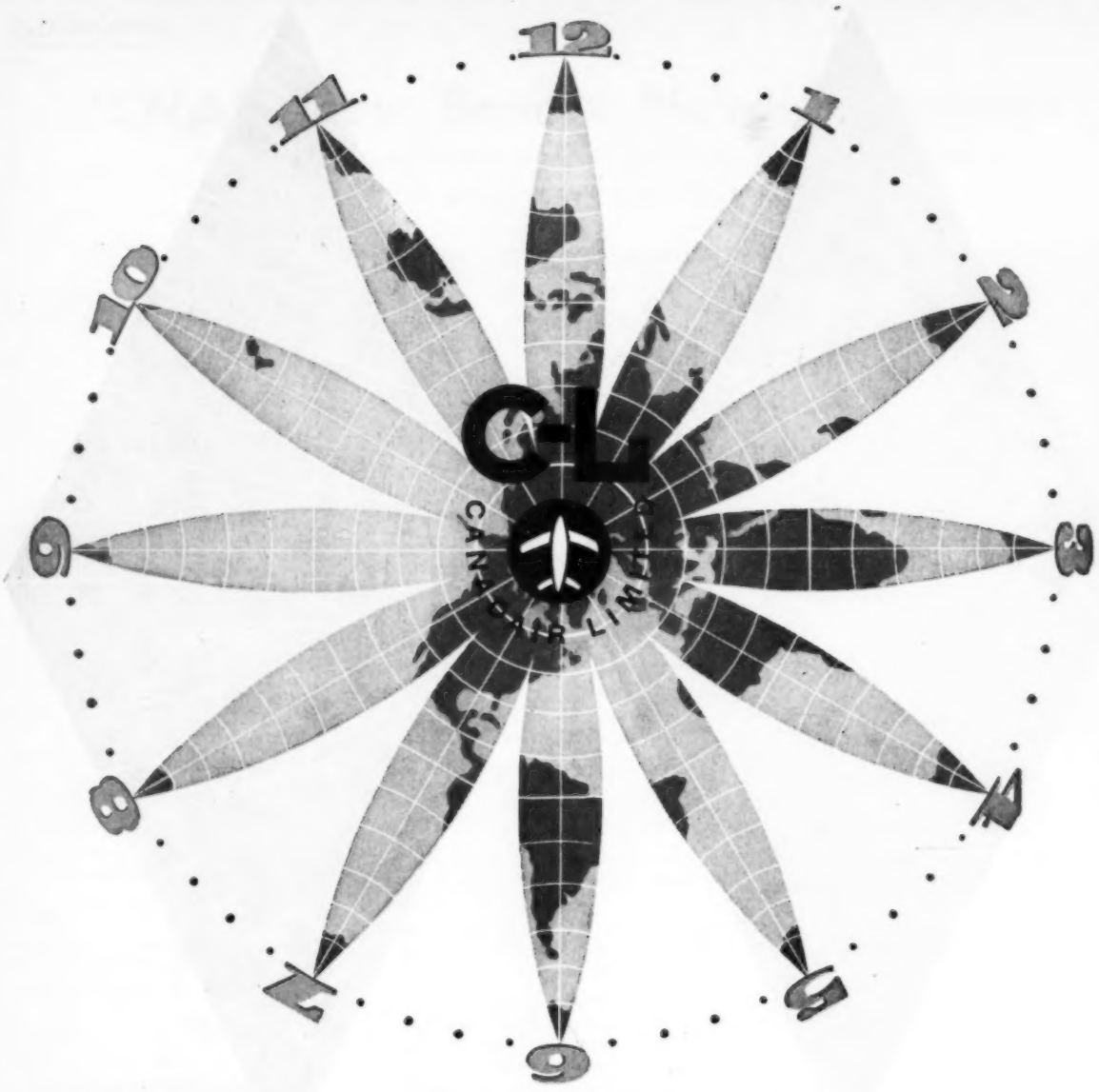
Now fully proved out and ready for installation, Missile Master offers pushbutton protection for whole cities and strategic areas.

The system collects information on the position, identity and flight data of all aircraft entering the network. This data is stored electronically and distributed to display consoles in the Operation Center and at the missile batteries.

Thus, the activity of Nike batteries and other advanced weapons in the system are centrally coordinated and controlled.

This important new weapon system is one of the great defense developments of our time.

MARTIN



ON CALL ...around the clock ...around the world

There are approximately 2000 Canadair-built aircraft in civilian and military service around the world. Wherever they fly, their operators know that Canadair's personal service on operational or maintenance problems is quickly available. Canadair technical representatives, at present based on four continents, are always on call . . . and as dedicated to the Canadair ideal of sales service as a family physician is to the needs of his townfolk.

These men have come from all parts of the world . . . from all spheres of aviation. They have been selected for their extensive knowledge of maintenance problems and for their specialized experience on the equipment in their charge. Their work is supplemented by aircraft systems trainers at the operator's own base; service repair and overhaul groups at the main Canadair plant, and a continuous flow of manuals, handbooks and bulletins. Around the clock and around the world, service is a continuing obligation to Canadair.

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CANADAIR HAS BUILT MORE JET AIRCRAFT THAN ANY OTHER CANADIAN MANUFACTURER

(Continued from page 40)

it enters the electronics enclosure.

First choice for vacuum tubes in equipment of this type would have been for miniature tubes. However, the 250° minimum exhaust temperature limitation forced a choice in favor of subminiature tubes.

Tubes were known to be the major source of heat in the package. The maximum bulb temperatures for miniature tubes were too low to generate the required exhaust temperature. So, although limited by the relatively few subminiature types available, their limited plate voltages, high capacitance and socket wiring difficulties, this type was chosen.

Chimney Cooling

The prototype CNAS used parallel air flow cooling. Air is introduced into the front cover of the main frame and goes under each chassis and over the components. After picking up some heat from these, it is piped through a vacuum tube "chimney" cooling arrangement designed to pick up the most possible heat from the tube walls.

Around each tube socket there are air orifices. Air passes through these and then between a stainless steel tube shield which forms the chimney flue and the tubes, where heat is transferred to the air from tube walls operating at 350°F.

Prototype work called for parallel type cooling. This method uses available cooling air by blowing it over all chassis parts simultaneously. However, in CNAS problems occurred in meeting both the 250° exhaust limit and efforts to keep the chassis temperature within the design limit of 185°F set by Bendix.

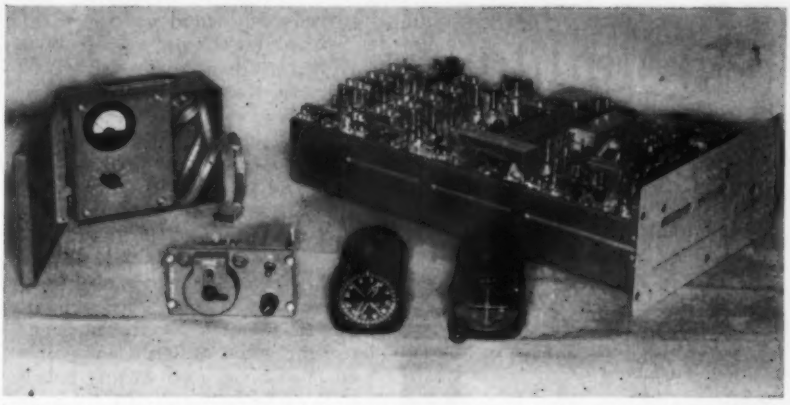
The chassis temperature limit was dictated by what components could take and temperature sensitivity of tuned circuits such as IF transformers. It was found stainless steel tube shields aided chassis cooling, but to only a small degree.

• **After going through** the vacuum tube chimneys, the air goes to an exhaust port. Much better temperature control could be perhaps achieved in the final design by going to a series air flow arrangement.

The VHF and navigation chassis can go to a higher temperature than the others. In series cooling the air would reach these chassis last by being directed to them through a hood sealed to the exhaust port.

In this way Bendix believes they can achieve the 250° limit and keep critical the chassis part within temperature limits. Here again, the problem of added weight and poor accessibility looms up to further challenge the designers. Further refinements must be sought before answers are finalized.

New limits on rugged construction were placed before Bendix in the need for CNAS. A marked departure was called for by elimination of vibration isolators.



(Right) The Bendix Radio CNAS (Civil Navigation Aids System) designed for a new aircraft weapons system which was designed for a supersonic aircraft. Associated with the packaged electronics is a plug-in spot-checking test meter shown on the left. In the foreground are (left to right): control panel; radio magnetic indicator; glide-slope, localizer, marker beacon, course indicator.

During sustained high g value maneuvers of the new aircraft, isolators would bottom and transmit vibration to the chassis anyway unless isolators were of the low resilience type. Low resilience isolators, if used, would permit serious resonance to be encountered within the expected vibration frequency range.

Without isolators no sway space was needed and this gave more space in the assigned enclosure space for components. But new approaches to component mounting had to be sought.

• **It was necessary** that mechanical resonances be kept either above the maximum vibration frequency or damped to prevent damage. Items with any appreciable size or weight had to be tied down at a number of points.

Tubes had to be carefully selected within microphonic limits to avoid modulation of signals at the vibration frequency. Quartz crystal plates had to be mounted on heavier, shorter wires inside their holders, and a Teflon liner was added that increased shock limits on the crystals. Crystals are in a turret driven by a stepper switch. No gears were used since chattering of them under vibration conditions was expected.

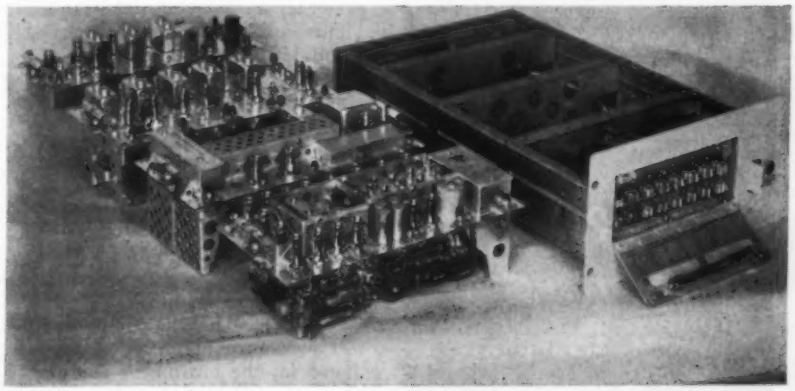
The experience gained through this work has convinced Bendix's engineer William Richardson, principal engineer on the project, that "shock and vibration isolators are a thing of the past."

Metal forming was used to give strength to the chassis. Punched plates with generous use of gussets were used. Lightening holes were freely used to save weight. Except where high strength or soldering was necessary, aluminum was the material used. Where needed cadmium plated steel was used.

Maintenance Aids

Maintenance, a critical consideration today with the serious shortage of technical servicing personnel in the Air Force, was carefully considered in CNAS.

All "iron," or non-adjustable fixed



Sub-chassis of the CNAS package shown removed from the carrying frame. Cooling air enters through the fuse cover door (shown folded down) and then goes to the bottom of the package. After that it goes through holes in the tube supports and through the "chimneys" formed by the stainless steel tube shields.

setting components were placed in the center of sub-chassis, and removable or adjustable components were placed on the outside for easy access.

The glide slope receiver has a top and bottom chassis that is hinged, but this is done without electrical separation. The top section of the VHF receiver is a plug-in assembly to permit accessibility to components underneath.

The RF-IF-Audio chassis is composed of four sub-assemblies for easy maintenance. These are RF section, variable IF assembly, selective filter and IF, and the audio section. Components are mounted on printed writing boards.

Although existing CNAS equipment for the Phase I portion of the project is intended for a specific aircraft, Bendix believes the electrical and mechanical design represents a significant improvement over previous equipment. It would be readily adaptable to other installations, either in jet or propeller driven aircraft.

Reliability was stressed in the design. The fewest possible number of components were used. Although vacuum tube heater strings were connected in series across the 28 volt ac supply in the Phase I model, the Phase II model will be operated in parallel from a 6.3 volt step-down transformer across the 115 volt ac line available. Tube reliability can vary considerably when the filament voltage is subject to deviation. The 115 volt supply is well regulated.

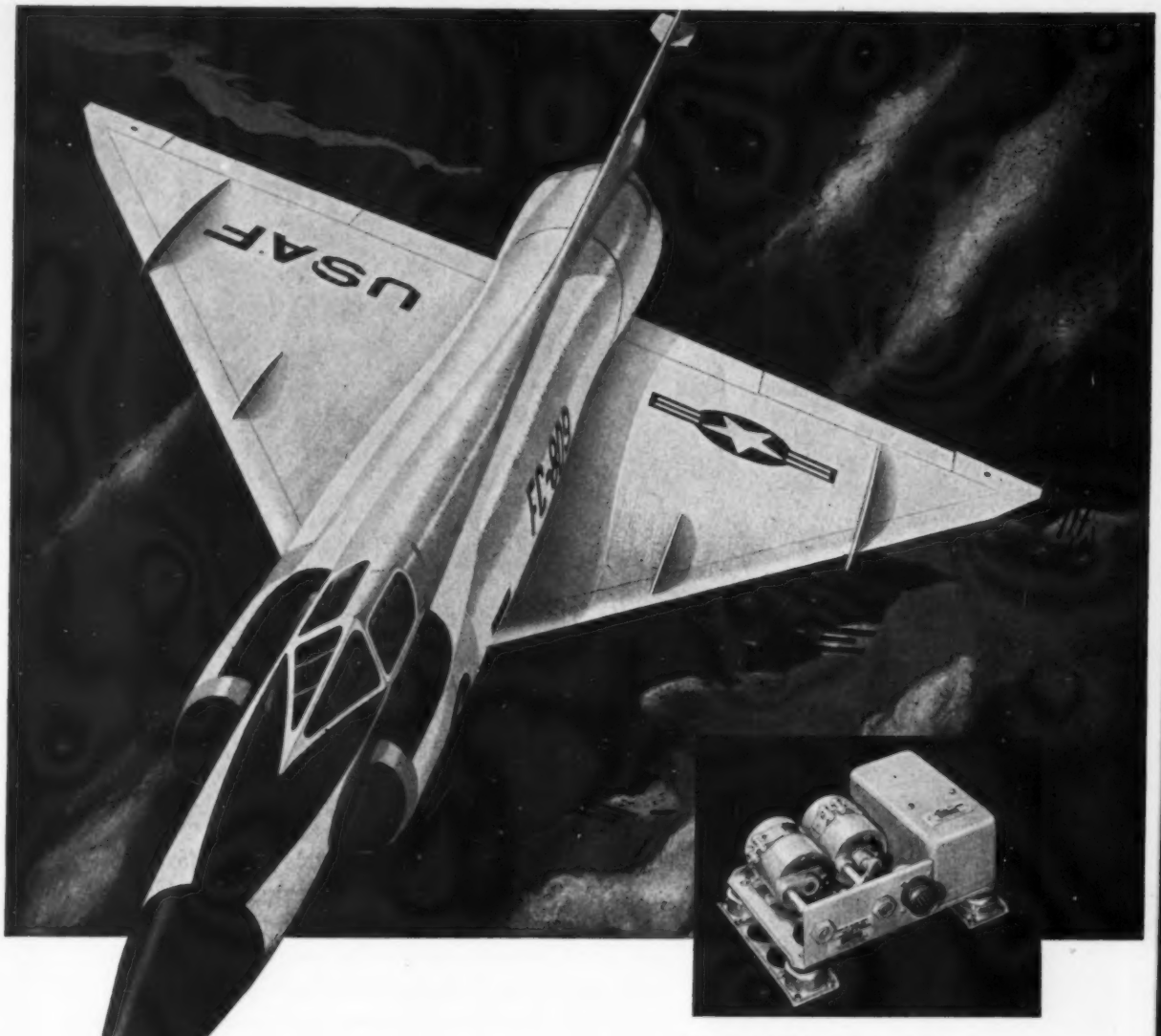
• **The package carries** no power supply. Input power required is about 100 watts. Predicted weight of the package is 34 pounds. Size of the receiver package is 5⅜" x 11⅜" x 22".

Outputs of the receivers feed an ID-387/ARN course indicator, ID-250/ARN radio magnetic indicator, autopilot, interphone amplifier. Omnibearing dial indicator is built into VHF navigation chassis for test purposes.

Functions of the VHF 140 channel navigation chassis include:

- Omni-range facility on even tenth megacycles between 108.0 and 111.9 plus all frequencies between 112.0 and 117.9 mc inclusive.
- Localizer facility on odd tenth megacycles between 108.0 and 111.9 mcs.
- Voice reception from 118.0 to 121.9 mc.

• **The glide slope receiver** has 20 channels starting at 329.3 mc and extending to 335.0 mc at intervals of 0.3 mc. The IF frequency was made low to keep frequency drift to a minimum under the temperature conditions to be encountered. The glide slope and localizer portions of the receiver can be separated for the instrument approach system should TACAN replace VOR. All glide slope and localizer frequencies can be changed over to new pairings with slight wiring changes. ◆◆◆



The Interceptor champion has a midget manager

Giannini Trim-servo System specified for Convair F-102A... wide range...high altitude...sensitive

The development of Century Series Aircraft has greatly intensified the need for Giannini precision instruments and systems to simplify the increasing complexities of high speed, high altitude flight. An outstanding example is the Giannini functional Mach computer for the elevon trim-servo system which enables the Convair F-102A all-weather interceptor to maintain subsonic trim characteristics at supersonic speeds.

The trim-servo system, a highly accurate Mach number and altitude sensing-computing system which reacts to speed changes as small as 0.0005 Mach, is one version of the servoed bridge network computing systems previously designed and developed by Giannini avionic engineers. The basic design has such capability and flexibility that a prototype computing system was produced for Convair in less than three weeks. Delivery of the first production model was made in less than two weeks from date of purchase order.

This rapid design and development is one more instance of Giannini's superior performance in the engineering and production of quality airborne equipment.

Engineering positions are open at several Giannini locations for career-minded young men—write for details.

Giannini

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20 M.P.H. HIGHER CRUISING SPEED GUARANTEED FOR YOUR DC-3

New "Maximizer" kit not only gives you a guaranteed speed increase without an increase in horsepower, but improves the safety, range, payload and economy of your DC-3

Here's how this new "Maximizer" works: A newly-designed, completely integrated system of engine cowling, engine baffles, oil cooler ducting, wheel well doors and tail wheel well closure, and exhaust system is installed.

Each of these modernizing improvements acts to reduce drag. Single engine rate of climb is greatly improved, fuel consumption decreased, range increased, payload improved...and cruising speed is raised a guaranteed 20 miles per hour!

The AiResearch Aviation Service Division is the exclusive world-wide distributor for the "Maximizer" kit. For further details, send for our free brochure.

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(conditions of guaranty outlined in brochure)

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"MISSILE WITH A MAN IN IT"

Lockheed/USAF F-104

World's Fastest Jet

The F-104 *Starfighter*, now in production for the U. S. Air Force, is the most advanced airplane of its type ever developed. *Dimensions:* height, 13 feet, 6 inches; length, 54 feet, 9 inches. *Wings:* knife-sharp, and only 7½ feet from fuselage to wingtip. *Engine:* General Electric J79, which develops more thrust per pound of engine weight than any other turbojet of comparable size. *Electronics system:* new "plug-in" type, to permit quick changes and replacements of components. *Pilot's seat:* downward firing ejection type, the first in a production jet fighter. *High, T-shaped floating tail:* twice as effective in controllability as conventional tail designs. *Armament and top speed:* both are military secrets, but the Lockheed F-104 can overtake and destroy any plane—of any size—known today.

The *Starfighter's* dart-like configuration, perfected by extensive wind-tunnel tests, permits the F-104 to flash through the sonic barrier, routinely, without a tremor. And even at supersonic speeds the *Starfighter* has unmatched ease and decisiveness of control—because never before have so many advanced design and engineering features been so superbly combined in one aircraft.

Like all Lockheed-built planes, the *Starfighter* has inherent "design flexibility" that makes it readily adaptable to a variety of military requirements—at lowest cost to our government.

Lockheed's leadership in the design and production of military planes, of nine widely different types, stems from its policy of close cooperation with the armed services. In the F-104 *Starfighter* the U. S. Air Force has the world's fastest and deadliest jet—America's "Missile With a Man in It."

Lockheed

AIRCRAFT CORPORATION

California Division, Burbank, Calif.
Georgia Division, Marietta, Ga.
Missile Systems Division, Van Nuys, Palo Alto and Sunnyvale, Calif.
Lockheed Air Terminal, Burbank, Calif.
Lockheed Aircraft Service, Ontario, Calif.

LOOK TO LOCKHEED FOR JET LEADERSHIP, TOO

LOCKHEED'S NEWS COLUMN

Dick Tracy has lost his lead *in the electronics race. His wrist radio is surpassed by a new "miniaturized" TV camera. Small enough to fit into a vest pocket, its "eye" is about the size of a cigarette. Built by Lockheed for research ONLY . . . (so far) . . .*

Missile Mail is promised in the foreseeable future as a civilian development of missile technology. A Lockheed official says that the thousands of scientific and technical people now researching the whole environment of man in connection with missile development will produce civilian benefits beyond the imagination of the layman today. A letter by missile, of course, would get there faster than you could write the letter in the first place . . .

A Lockheed Man is working quietly in a sanctuary abroad on a nuclear engine design that will make headlines world-wide when they take the wraps off. Same man's blueprints on a nuclear contraption so startled top military authorities very early in the nation's atomic program that they locked his patent in a government vault where, for security reasons, it still remains . . .

Lockheed has been handed *a big piece of the much-talked-about ICBMissile that will keep its Missile Systems Division scientists working nights in their new facility near Stanford University — which, incidentally,* **tripled** *in size between blueprints and ground breaking . . .*

Beating the heat which tops 250 degrees Fahrenheit at twice the speed of sound is a matter of concern now to engineers of Lockheed's California Division who are working on methods of making airplane skin glass-smooth. Even modern, high-strength dural surfaces approach their temperature limits at these speeds . . .

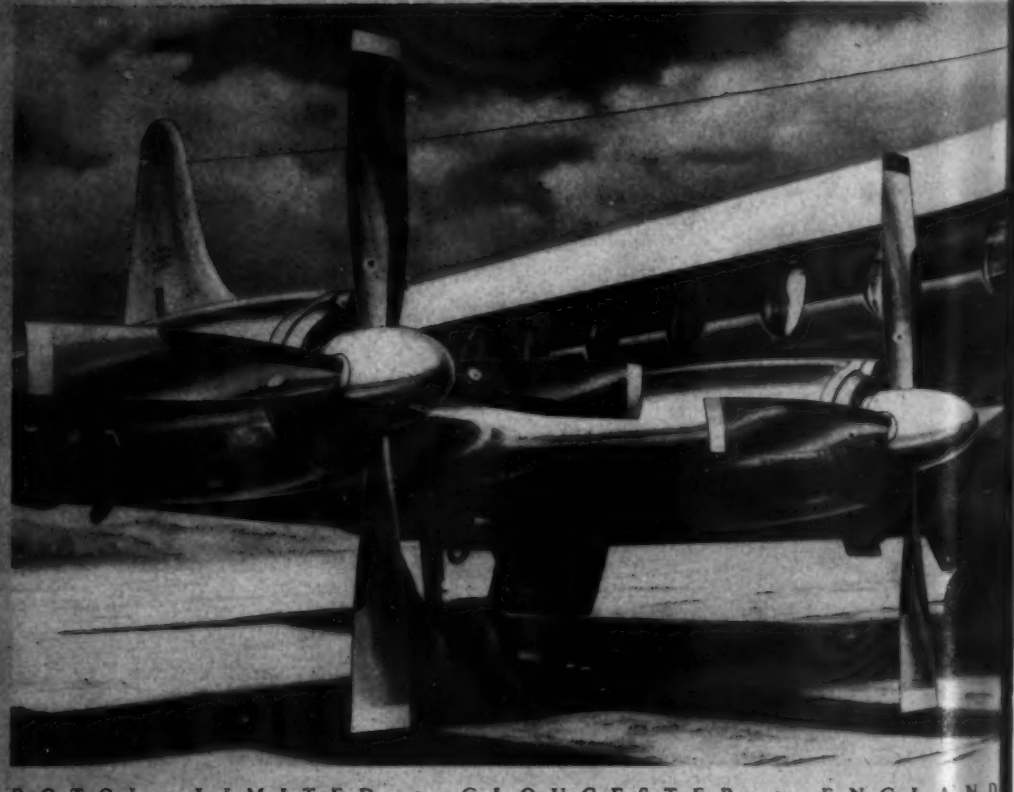
Early America makes atomic history this month as Lockheed Georgia Division breaks ground for its new atom-powered plane facility. The 10,000-acre North Georgia site was in the same family ever since the area opened for settlement in the 1840's.

ROTOL *Propellers*

. . . are fitted to over 100 Vickers Viscounts in airline operation.

. . . have been specified for over 200 more Viscounts now on order.

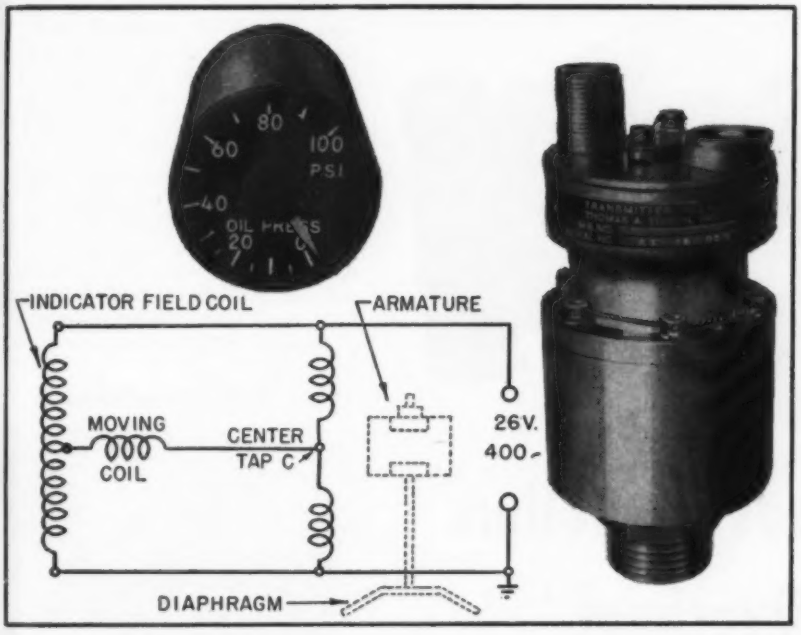
. . . on the Viscounts have completed nearly a million flying hours.



ROTOL LIMITED · GLOUCESTER · ENGLAND

New Products and Processes

EDISON UNVEILS NEW INSTRUMENT SYSTEM



Thomas A. Edison, Inc. Instrument Div. has developed a new 2.5-pound fluid pressure indicating system said to increase the reliability and accuracy of readings in high-speed aircraft.

The new system, already specified for Lockheed's F-104 supersonic Air Force fighter, converts fluid pressures to electrical signals directly on an aircraft engine. This dispenses with the need to mount transmitters on shock or vibration isolators.

A joint development of Edison and USAF's Wright Air Development Center, the system reportedly maintains a 1.0% accuracy through a vibration range up to 500 cycles per second in temperatures up to 232°C and shock to 20 g's.

Basic design consists of two units, an engine-mounted transmitter and cockpit indicator. Both operate from a 26-volt, 400-cycle power source and are interconnected by three ordinary unshielded copper wires.

In operation, the fixed coils of the transmitter and indicator are connected to form an a-c bridge and a moving coil in the indicator serves as a galvanometer leg. Pressure acting on a transmitter diaphragm changes the position of the armature relative to air gaps (see sketch). This changes the relative inductance values in two halves of the transmitter coil, causing a change in voltage at center tap "C."

This in turn unbalances the circuit and changes the current flow in the indicator moving coil. The coil then rebalances the circuit by moving to a new angular position so that net torque in the coil is zero.

Circle No. 150 on Reader Service Card.

PORTABLE PAINT HEATER

A portable paint heater made by **The DeVilbiss Co.** enables users of the hot spray process for painting to achieve greater efficiency and obtain better finishes, according to the manufacturer.

Mounted on a two-wheel cart resembling a golf-bag cart, the unit enables the painter to reduce material costs resulting from over-spraying and fog.

The DeVilbiss hot spray process is said to give better coverage with heavier film. The heaters are manufactured in either three or six-kilowatt models, with the higher-capacity model producing ample heat so that more than one spray gun can be used.

Circle No. 149 on Reader Service Card.

SEALING COMPOUND

Greer Industries, Inc., newly formed affiliate of Greer Hydraulics, Inc. has announced availability of Disogrin, a synthetic elastomer for a variety of aircraft sealing applications.

Proposed uses include fabrication as accumulator bladders, O-rings, valve seals, molded diaphragms and as metal reinforced scrapers. The compound is said to have high tensile strength, extreme abrasion resistance properties as well as resistance to oil and jet fuels.

Tests of resistance to JP-4 jet fuels show a volume change of only plus 3% for Disogrin, compared to 12% for Buna-N and 19% for Neoprene.

Circle No. 154 on Reader Service Card.

FUEL AIR COMBUSTION JET STARTER

Boeing Airplane Co. has notched six months experience using a Hamilton Standard fuel-air combustion starter in its 707 jet transport prototype. The H-S unit permits the 707 to operate from any suitable airport without supporting ground power units.

Designated Model FAS 700-4, the starter is fitted on the 707's left outboard Pratt & Whitney J57 engine. It

NEW PRODUCTS

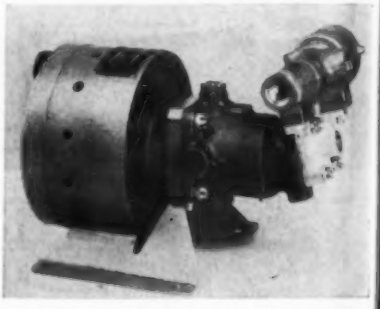
has logged more than 250 starts, operates much the same as a gas turbine engine.

Compressed air from an airborne storage bottle is combined with JP-4 fuel from the airplane's normal fuel system and ignited. Gases turn a small turbine, the shaft of which is geared down to crank a J57 to starting speed in less than 20 seconds.

With one engine started, air pressure bled from its compressor is then used to start the 707's other engines. Three starts can be made with the H-S starter without exhausting bottle air pressure. In flight the bottle is recharged by a small electric-driven compressor.

Circle No. 172 on Reader Service Card.

POWER PACKAGE



Vickers, Inc. is marketing a series of hydraulic-driven airborne electrical power packages ranging in weight from seven to 19 pounds. Units are operated directly from the aircraft's hydraulic system to provide ac electrical power in one of six ratings from 0.5 to 3.0 kva.

The Vickers units are intended for new aircraft electrical system designs or as a power supply for electronic equipment being added to existing aircraft. Major components of the power package are a permanent magnet, 400-cycle ac generator and a flange-mounted constant-speed hydraulic motor, with direct drive between the generator and hydraulic motor.

Circle No. 183 on Reader Service Card.

MAGNETIC RECORDING UNITS

Ampex Corp. has announced an all-new series of modular magnetic recording units for telemetering, playback of flight-test data, and for acquiring data from ground tests such as static load studies.

The FR100 series is made with one to 14 tracks, for data in the dc to 100,000 cps range. Interchangeable plug-in amplifiers are used for Direct, FM and PWM types of recording. Six standard speeds from 1⅞ to 60 inches per second are provided and can be selected

This new integrating accelerometer is a basic component of Honeywell's inertial navigation and guidance systems. Containing an adaptation of the famous HIG gyro principle, the Honeywell accelerometer is a sensing device capable of measuring accelerations as minute as $\frac{1}{100,000}$ of gravity. It represents another step by Honeywell toward perfecting pure inertial guidance—the automatic navigation technique being developed to guide intercontinental ballistic missiles.

AERONAUTICAL DIVISION, MINNEAPOLIS-HONEYWELL

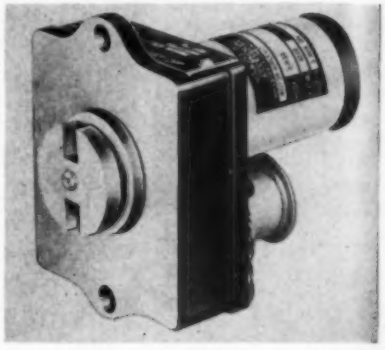
NEW PRODUCTS

through two speed-selector controls.

The units feature reduced space requirements, and need 73½ inches of rack space for a complete 14-track system including transport, electronics and blower modules.

Circle No. 186 on Reader Service Card.

ROTARY ACTUATORS



Airborne Accessories Corp. has introduced two new series of rotary actuators that have numerous aircraft applications.

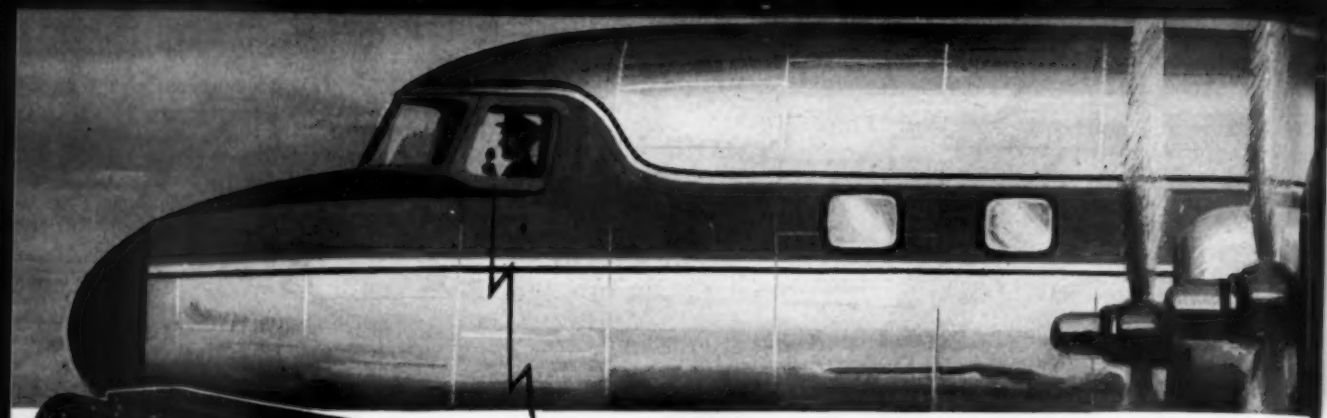
Series R-5140, shown here, is a 1-lb. linear actuator with a miniature 26VDC motor that provides magnetic braking. It includes a radio noise filter, limit switches externally adjustable, positive stops, optional thermal protection and anti-rotation device. Speed at maximum operating load of 150 lbs. is 12 in./min. Ultimate static load is 600 lbs. Unit measures 2 5/8 x 1 3/16 x 4.0 in.

Series R-4100 26VDC is rated at 36 lb. in. maximum and 3 rpm. It has a magnetic brake and adjustable limit switches for up to 120° rotation, weighs only 10 oz. and measures 2 x 2 7/8 x 3 in. Thermal protection is optional.

Circle No. 199 on Reader Service Card.

SUBMINIATURE RELAY

General Electric has developed a two-pole, hermetically sealed subminiature relay featuring positive adjustment of contact and plunger travel. It is designed for electronic applications in



TA-20 TRANSMITTER, RA-18 RECEIVER

Each provides 360 crystal-controlled channels from 118.0 to 135.95 megacycles with 50 kilocycle channel spacing. Receiver: 3-microvolt sensitivity with carrier-operated squelch control. Transmitter: 25 watts minimum of r-f output power.

Nearest thing to Personal Contact!

RG-9 RECEIVER, TG-19 TRANSMITTER

Receiver: 118.0 to 135.9 megacycles. Single-channel operation with 50 kc channel separation. Transmitter: 108.0 to 135.9 megacycles. 50 watts r-f output power. Single channel with facilities for dual channel operation on output frequencies within 800 kc.

Bendix VHF Airborne-Ground Communications

The best way to talk to somebody is "in person." No question, then, about getting things straight. But, of course, it's out of the question in this age of travel.

The next best thing to do is to match this way of communicating as closely as you can. That's Bendix* VHF Airborne-Ground Communications.

The complete system consists of the RA-18 and TA-20 Airborne Receiver and Transmitter; and the RG-9 and TG-19 Ground Station Receiver and Transmitter. *Combined weight of the airborne units including power supplies is 49 lbs.*

TO DATE, 80% OF THE AIRLINES THAT HAVE CHANGED TO 360-CHANNEL OPERATION HAVE SPECIFIED BENDIX RA-18 RECEIVERS.

If you have a communications problem or are contemplating replacing your present equipment, we would like to present our story. Write us direct. Bendix Radio, Aviation Sales, Baltimore 4, Maryland.

*Reg. U.S. Pat. Off.

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Bendix International Division, 205 E. 42nd St., New York 17, N.Y., U.S.A.
Canadian Distributor: Aviation Electric, Ltd., 200 Laurentian Blvd., Montreal, Que.

NEW PRODUCTS

aircraft under severe environmental conditions.

New design features have eliminated so-called "blind assembly." By means of a small screw-like attachment that extends outside the can from the end of the relay, final adjustment of contact and plunger travel may be made from the outside after the can has been put into place. After the adjustment, the outside portion of the attachment is cut off and the area sealed over.

Circle No. 170 on Reader Service Card.

TACHOMETER GENERATOR

Tachometer generators introduced by the **Barber-Colman Co.** are adapted from the company's line of Type BYLM permanent-magnet motors. Three frame sizes are available with maximum rated outputs of 7,000 rpm or 100 volts, whichever occurs first.

These generators are used in the surface control systems of guided missiles. They may be adapted for speed readings when coupled with a voltmeter graduated in rpm rather than in volts. They are capable of supplying output voltages up to 40 volts per 1,000 rpm within plus or minus 0.5% linearity. Literature is available.

Circle No. 168 on Reader Service Card.

SOUNDSCOPE

Mine Safety Appliances Co. has introduced an electronic instrument called Soundscope for accurate measurement and analysis of noise.

The M-S-A Soundscope is based on

NEW PRODUCTS

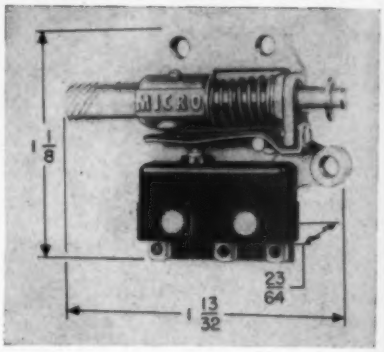
a design developed for this company by Allison Laboratories, Puente, Calif. It measures overall sound level at the microphone over the range of 24 to 150 decibels, on an averaging-type meter with a range of 16 db.

The analyzer section of the instrument measures sound in each of eight octave bands to determine noise peaks.

Weighing 20 lbs., the instrument is expected to be valuable to engineers studying aircraft noise abatement problems.

Circle No. 167 on Reader Service Card.

DOOR INTERLOCK SWITCH



Micro Switch, a division of Minneapolis-Honeywell Regulator Co., has developed a subminiature door interlock switch for use on radio, radar, X-ray and other hazardous high-frequency equipment cabinets.

Designated 7AC1-T, the tiny switch (measuring 1 1/8 x 1 13/32 in.) cuts off power automatically when a service door is opened. By pulling a rod actuator to the maintained contact position, it is possible to check circuits with the power on. The rod automatically returns to normal position when the door is closed.

Circle No. 166 on Reader Service Card.

Product Briefs

• **Consolidated Electrodynamics Corp.** has introduced a pressure pickup, Type 4-316, said to be capable of more than doubling the existing temperature range for this type of transducer. It operates continuously up to 600°F, provides accurate measurement under extreme environmental conditions.

Circle No. 178 on Reader Service Card.

• **Globe Industries, Inc.** offers a rate gyro with a dc-powered motor controlled by a governor, so that output is independent of line voltage. It measures 2⅜ in. x 4-7/16 in., weighs 1.7 lbs. Standard units incorporate a potentiometer pickoff and adjustable switches that can be set to close at any desired rate within the unit's range.

Circle No. 179 on Reader Service Card.

New plant now filling big demand for Teflon® hose

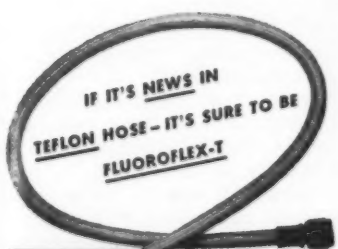
THIS newly opened Resistoflex plant is now producing Fluoroflex-T hose and assemblies at a greatly increased rate. Ample, efficiently planned space, enlarged production facilities, added equipment . . . these make it possible to turn out record quantities of the finest quality aircraft hose ever developed.

Fluoroflex-T hose is the *original* Teflon hose. It's the only Teflon hose proved by over 3 years' flying service, and is now universally specified for vital applications.

This hose has approval of the Services and CAA for synthetic oils, fuels and nitric acid . . . and is applicable for ambient temperatures up to 500°F. Bulletin FH-2 tells more. Send for it.

RESISTOFLEX CORPORATION, Roseland, New Jersey; Western Plant: Burbank, Calif.

®Teflon is a DuPont trademark. Fluoroflex is a Resistoflex trademark.

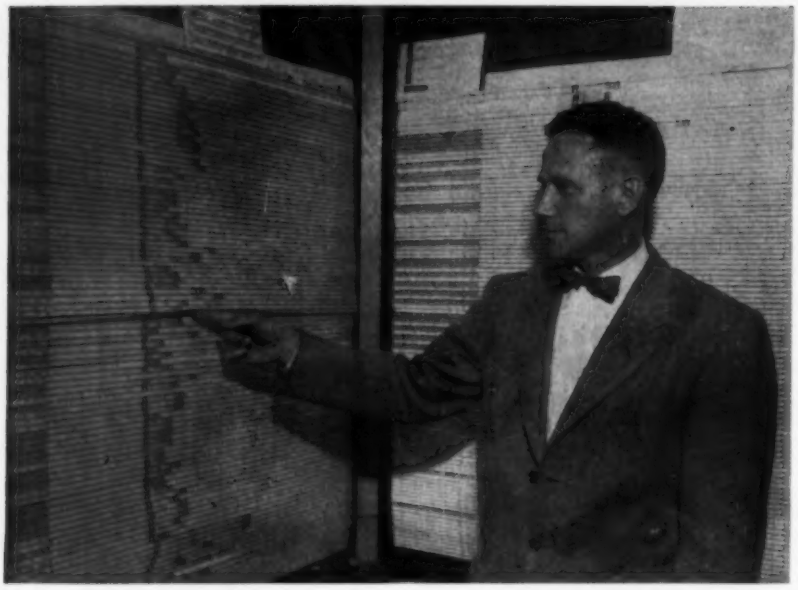


20th year of service to industry

Resistoflex

Circle No. 25 on Reader Service Card.

How to Card-Index Your Overhaul Shop For Better Production Planning



Northwest's maintenance director R. C. Zinn spots workload for an incoming transport on Remington Rand Sched-U-Graph planning board.

A streamlined production planning system built around the use of Remington Rand's Sched-U-Graph production control boards is paying big dividends at Northwest Airlines' St. Paul, Minn., overhaul base.

NWA maintenance director R. C. Zinn figures it has cut maintenance time from 10.5 to about seven man-hours per airplane hour flown. At the same time it has given the airline a net increase of approximately 10% in the total time required to service its fleet of 47 transports.

• **Back** in 1927 when Northwest got its start, says Zinn, maintenance was a relatively small problem. That year the airline carried only 106 passengers over the 400-mile route between the Twin Cities and Chicago.

Such an operation produced little need for any form of shop production control and until recent years the whole planning job fell on the shoulders of the shop foremen.

But today Northwest operates over a system of nearly 18,000 unduplicated route miles. In 1955 it carried more than 1.3 million passengers with a fleet that includes Boeing Stratocruisers, Lockheed Constellations, Douglas DC-3s, DC-4s and DC-6Bs. This, says Zinn, involves considerably greater maintenance problems.

• **Northwest's answer** to a good share of these headaches came into being in 1953 when it went into full-scale production planning for its maintenance operation. The results, states Zinn, were apparent immediately.

• For the first time the airline could be sure of getting a plane out of the shop and into service on a rigidly planned schedule.

• It had a much closer knowledge of exactly what was happening to every aircraft in overhaul and every accessory part undergoing repair.

• It cut maintenance time per airplane hour flown by almost 33%. It dropped from 10.5 to seven man-hours.

• It gained nearly 10% in total time needed to service its 47-plane fleet.

• **Nucleus of the system** is a bank of about 25 Remington Rand Sched-U-Graph boards spotted in 12 principal shops at NWA's base. These boards, which hold work-order cards, provide visible signals and time bars that give shop supervisors a meticulous control over every step in the aircraft repair and overhaul cycle.

Before adopting the new system, work orders were written on a single sheet which detailed the various steps required for each plane. These, Zinn, recalls, were usually "lost" in the shop until a job neared completion. "We had no really effective way of controlling the work or the time it took."

• **With Sched-U-Graph,** Northwest now handles the same operations with a large number of small cards. Each represents one type of work to be done. They are distributed throughout the shops under the close control of the Sched-U-Graph system.

Northwest breaks down its overhaul work into three job categories—routine repair and overhaul that occurs at set intervals; non-routine inspections jobs required to maintain the aircraft in good operating condition; and project work which generally involves modification to install improved equipment.

Each time an airplane enters the shop Northwest figures it will undergo about 1,000 different routine operations and 800 to 1,000 other non-routine items.

Every one of these operations is represented by a card that gives all pertinent data on the airplane and the job to be done, the time it takes and who is responsible.

• **In addition,** on individual parts and accessories, Northwest has a similar tag system. A double tag is attached to a rebuilt or new part, and when it is installed on an airplane, half of the tag is attached to the old part being returned to the shop.

Routine work cards are printed in advance—only the airplane number needs to be inserted when a plane goes into work. Non-routine and project cards have to be prepared individually in the maintenance department and are sent to the proper work station in the overhaul shop as the work program shapes up.

Once the complete bill of work for an incoming airplane is assembled on Sched-U-Graph boards, the shop foreman or work control clerk has a complete picture of the sequence of jobs and what each man or department is scheduled to accomplish during the day.

• **One of NWA's shops** has eight boards mounted on a trolley arrangement. The boards can be rolled forward as the work progresses, and as soon as the workload on one is completed, it can be removed and others rolled into place.

This planning "production line" covers several days' work on two or three planes and is first laid out on paper by a production planner and work supervisor, then arranged on the boards accordingly. The supervisor then not only knows today's workload but also how the airplanes will progress for the following two days.

Normal shop schedule calls for three planes in work at a time—one Boeing 377, DC-6 or Constellation, one DC-4 and one DC-3.

• **Northwest figures** that a good share of its time-saving with the system results from the ability to order out parts and materials in advance of their need. In the past it was common to lose considerable time while mechanics waited for materials needed to get on with a job. ◆◆◆

Have you heard about the great new

GULF AIRCRAFT ENGINE OIL?

It's proved 5 ways better

Gulf laboratory and flight tests *proved* it.

And now—private operators and operators of executive fleets and airlines are confirming everything we say for this new high-quality oil.

Here's what new Gulf Aircraft Engine Oil does for your engine:

1. Improves internal engine cleanliness.
2. Minimizes sludge and oil inlet screen deposits.
3. Lowers rate of parts replacement due to wear.
4. Low pour-point for ease of starting even in coldest weather.
5. Increases periods between engine overhauls.

Try new Gulf Aircraft Engine Oil in *your* plane. Find out for yourself how these 5 advantages can give you *maximum operating efficiency* and *increased economy* through cleaner engines and less frequent overhauls!

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AVIATION PRODUCTS

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Circle No. 11 on Reader Service Card.

People

MANUFACTURING

Perry R. Roehm elected president of Norden-Ketay Corp., succeeding **Morris F. Ketay**, retiring.

Kenneth F. Mundt promoted to vp Aerojet-General Corp.

William W. Chapman appointed sales mgr. of aircraft products division of Kawneer Co.

Arnold E. Hayes made secretary and gen. mgr. of Clifton Precision Products Co., Inc.

William F. Johnson appointed director of sales of Consolidated Electrodynamics Corp., succeeding **Joseph F. Davidson**, named marketing vice president of Arnoux Corp., Los Angeles.

Theodore W. Jarmie named vp and gen. mgr. of the EECO Production Co.

George W. Lober appointed sales mgr. of Sperry Gyroscope Co.'s new microwave electronics division; **Hugh E. Webber** named chief engineer of the division.

Niels C. Beck is new director-general of the Union of Burma Applied Research Institute at Rangoon.

Norman J. Davidson appointed director of commercial sales and **Robert J. Maroni**, director of military sales, Curtiss-Wright Corp.

W. A. (Dick) Pulver named asst. chief engineer of Lockheed-Marietta; **Henry C. Bosserman** appointed chief pilot of fighter and trainer dept. at Palmdale.

William Cunningham named sales supervisor of aircraft test equipment for Greer Hydraulics, Inc.; **Gerard A. Muller** appointed contracts supervisor, test equipment division.

A. L. Paquette named sales mgr. for aircraft equipment dept. of Westinghouse Electric Corp. small motor division, Lima, O.

Trevor Gardner elected president of Hycon Mfg. Co.

Morris Ackerman promoted to chief simulator engineer and **Charles B. Smith** to chief project engineer of flight training simulator section of ERCO division, ACF Industries Inc.

Charles W. Hosterman appointed gen. mgr. of the electronics division, Sylvania Electric Products, Inc.

Arthur T. Curren named mgr. of commercial sales in Boeing Airplane Co.'s transport division; **A. Elliott Merrill** named mgr. of military transport sales, succeeding **D. B. Martin**, recently named dir. of sales for Boeing Seattle division.

Don Marshall joined The Frye Corporation as gen. sales mgr.

Ray W. Beck named vp and production mgr. of Aero Corp.

Eduard Baruch elected president of The Heli-Coil Corp.; **Walter Mann** elected exec. vp; **Louis R. Ripley** made chairman of the board.

William F. Whitesides named engineering mgr. for Flight Refueling, Inc.; **C. Harry Smith** made chief engineer.

Jack Mannion named asst. to vp and gen. mgr., Northrop Aircraft.

Vernon H. Vogel appointed director of engineering for Aeronautical Division of Robertshaw-Fulton Controls Co.

William P. Lear, Jr., appointed manager of Lear S.A., a Swiss subsidiary of Lear, Inc.; **J. M. Walsh** named asst. division gen. mgr. of the Grand Rapids Division of Lear, Inc.

A. V. (Bill) Strunk named chief engineer for Longren Aircraft Co.

William G. Robinson named public relations director for Cessna Aircraft Co.; **L. C. Gartin** appointed divisional service mgr. and **Robert J. Templer** made planning and training director.

Edward H. Schaar appointed advertising and public relations mgr. for Weber Aircraft Corp.

Edward L. Ladd succeeds the late **John M. Meyers** as president of United Aircraft Products, Inc.

Owen C. Davis elected treasurer of Vickers Inc.; **Thomas B. Doe, Jr.**, named mgr. of export sales.

Cyril C. Thompson appointed a full-time member of the Aircraft Owners and Pilots Assn. staff.

AIRLINE

Edwin Zak promoted to mgr. of aircraft engineering for Trans World Airlines; **M. D. Nason, Jr.**, named district sales mgr. in New York.

Zak

Fitzpatrick

Richard L. Fitzpatrick elected regional vp for American Airlines' southern region, replacing **M. D. Miller**, retired. Three new asst. vps. **J. D. Hungerford**, schedules and tariffs; **James H. Cobb**, advertising; **William G. Whitney**, planning.

Serge Wourgaft and **Bruce Findlay** appointed to public relations staff of the International Air Transport Assn. at Paris and Montreal, respectively.

Francis J. Roach named gen. mgr. of Independent Military Air Transport Assn.

R. B. Ault appointed director of engineering for Western Air Lines.

A. H. Milward made chief executive of British European Airways.

William M. Robertson named asst. for property management to exec. of Riddle Airlines.

Charles Bucks is new sales promotion mgr. of Continental Air Lines, Denver.

Jack Howe appointed asst. to vp-traffic and sales for Trans-Texas Airways.

Albert E. Morjig promoted to director of maintenance and **Michael J. Lewis** to superintendent of maintenance, Transocean Air Lines.

H. H. Murphy, Jr., appointed regional sales mgr. for Braniff International Airways' new eastern region.

Wyatt Fisher promoted to industrial rel. mgr. of Pan American World Airways' Pacific-Alaska division.

L. G. S. Hyland named asst. gen. mgr. (commercial) of British West Indian Airways; **Walter Girling** promoted to traffic mgr.; **Andy Johnston** named United States sales mgr.

GOVERNMENT

Brig. Gen. Edmund C. R. Lasher appointed exec. director of new Army Military Traffic Management Agency.

New appointments in CAA's office of aviation safety; **Omer Welling**, deputy director; **Ward B. Masden**, chief, air carrier safety; **Burleigh Putnam**, chief, general safety division.

Col. Leon Booth named special asst. to Lt. Gen. Donald L. Putt, DCS-Development, replacing **Col. J. E. Condron.**

Dr. Lloyd A. Wood named technical director of the directorate of research at the Wright Air Development Center at Dayton.

HONORS

C. L. (Kelly) Johnson, vp-research and development for Lockheed Aircraft Corp., named "Aviation Man of the Year" at the third annual Los Angeles Airline Ball, in recognition of his design of the Lockheed F-104A.

Frank Macklin, asst. vp-traffic of the Air Transport Assn., received the annual citation of the Air Line Traffic Assn. in Washington.

Dr. Hugh L. Dryden, director of National Advisory Committee for Aeronautics, is the seventh American to become an Honorary Fellow of the Royal Aeronautical Society.

Stanley R. Shatto, vp-operations for Western Air Lines, elected president of the Operations Conference of the Air Transport Assn.; **Frank C. Judd**, vp-operations and engineering for Northwest Airlines, named first vice president.

George H. Scragg, Cleveland business man and aviation pioneer, awarded the American Legion Merit Award for his lifelong contribution to aviation.

Walter T. Bonney and technical information staff at National Advisory Committee for Aeronautics, Aviation Writers' Assn. first public relations award.

Robert Parrish Named Managing Director of Official Airline Guide

Robert R. Parrish has been named managing director of *The Official Airline Guide*, an American Aviation Publication. He has been managing editor of the publication since September 1952 and on the staff nearly nine years.

PARRISH

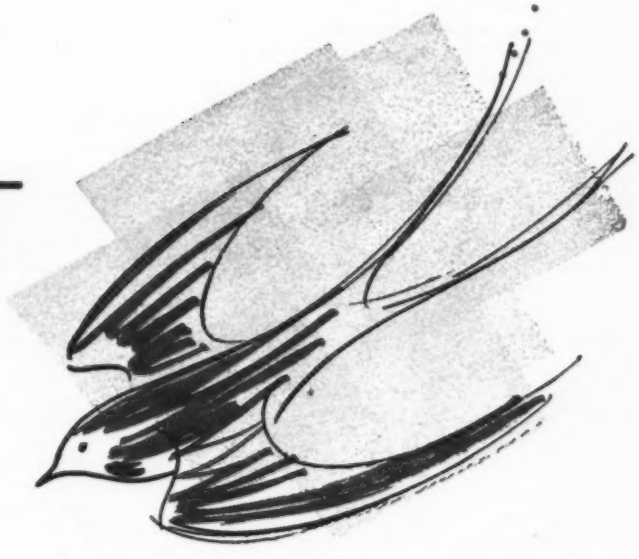
The Guide, published in World-Wide and North American editions monthly, is used exclusively by scheduled airlines and the air travel industry in the U.S. and is the standard reference of the Air Traffic Conference of America.

Parrish is a native of Decatur, Ill., served as a lieutenant (jg) in the navy during World War II. Prior to joining *The Guide*, he was employed by American Airlines.

His new duties include direction of business and circulation policies as well as editorial supervision.

follow the swallow . . . . . .

FLY LIGHT



ARC's new ADF weighs less than 20 lbs!

TYPE 21 ADF WEIGHS ONLY 19.7 POUNDS

Component Units Weights: Receiver, 6.8 lbs.; Loop, 4.3 lbs.; Loop Housing, 0.5 lbs.; Control Unit, 1.6 lbs.; Indicator, 1.3 lbs.; Power Unit, 5.2 lbs. *CAA Type Certificated*

Birds have nature's navigation instruments and can return unerringly to their nests from a continent away. They follow special flyways as you follow a chosen course.

But you can out-navigate the birds with ARC's miniaturized ADF. Here, after two years of testing, is an Automatic Direction Finder of great reliability—in a system whose combined parts weigh less than 20 pounds. It requires less power, too—only 2.8 amps at 27.5 volts. It has hermetic sealing of vital parts, including the entire loop, and other mechanical design features to insure ARC-dependability under today's exacting requirements. Now a dual installation, where required, will save 80 or more pounds and make room for other much-needed equipment or more payload.

The ADF is still the Number One worldwide navigational aid, usable on an estimated 60,000 radio stations. ARC's Type 21 is tunable to all frequencies from 190 kc to 1750 kc.

An outstanding feature is extremely low drag of the loop housing, which extends only two inches into the airstream.

Here is reliability you can trust—in a small package . . . high performance to ARC standards, trusted for 28 years. Ask your dealer for descriptive literature.

Omni/ILS Receivers • Course Directors • UHF and VHF Receivers and Transmitters
LF Receivers and Loop Direction Finders • 10-Channel Isolation Amplifiers • 8-Watt Audio Amplifiers • Interphone Amplifiers • Omnirange Signal Generators and Standard Course Checkers • 900-2100 Mc Signal Generators

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation BOONTON, NEW JERSEY

West Coast Talk . . . By Fred S. Hunter

- **Market value of DC-4s is high.**
- **Other resale prices strong, too.**

IF you have one DC-4 you'd like to sell, you can get about $650,000 for it; $700,000, perhaps, if it's a good DC-4 and you strike the market just right. If you have three to sell, the price will drop to around $500,000. If you have eight to sell, you break the market.

Hunter

Before Korea, resale value of a DC-4 went down to around $125,000. Things were slow then. Airlines were disposing of their DC-3s—which now would bring upward of $100,000—for $12,500 each. Korea shot the DC-4 up to a peak of $725,000. Right after Korea, the price fell back to $275,000, although it didn't tarry long and soon was on the way back up to the current level in the area of $650,000.

• •

Question before the house is what comes next. Airlines are being made aware of the tighter credit situation. This is reflected in the slow-down of new plane sales. Aircraft resale prices will remain strong, however, unless a number of planes are thrown on the market. This is highly unlikely at present traffic volumes.

We're in for another season where there aren't enough seats. Same thing is generally predicted for 1957. Then comes the $64,000 question. Will the new seats start catching up with the demand, and, if so, how will it affect resale values?

One carrier we know is so optimistic that in 1960, after the turboprops and the jets have arrived, it still estimates it will be able to sell its DC-6Bs for $1,000,000 each. What's your guess? Keep your eye on the DC-4 market for clues.

• •

Questions—Will the Air Force make this year's Thompson Trophy event a speed run for a record for Lockheed's F-104A, same as it did last year with North American Aviation's F-100? ? ? Is Convair's Atlas nearing the test stage? ? ? Will Boeing earnings go over $10 a share this year? ? ? Did Lockheed's missile systems division get a whopping contract on a very advanced project? ? ? Is North American thinking of bowing out of the 110A supersonic bomber competition, same as Convair did earlier, leaving the field clear for Boeing? ? ? Would Northrop's Snark be just about the ticket for the newly revealed low level H-bomb attack tactics? ? ? We just ask the questions, we don't answer 'em.

• •

With all due respect to Mr. Bill Wagner, the well-meaning drone salesman, we still think the Army should have tried to get a B-47 to use for a target in its demonstration of the Nike to the press at White Sands. Instead it used a Ryan Firebee, faithfully followed normal test procedures, and, judging from the accounts carried in the Los Angeles papers, no one was quite sure just how things came out. You gotta be dramatic to make an impression on the daily press. Now, if the Army had clobbered a B-47—well loaded with fuel—it would have filled the sky with just the kind of visual and audible boom that would have convinced the newspaper writers the defense of the nation was in good hands.

• •

Gus Briegleb intends to enter two and perhaps three of his new BG-12 sailplanes in this year's national soaring championships at Grand Prairie, Tex. and Paul Bikle will fly one of them . . . First Lockheed F-104As will go to the Air Defense Command . . . Martin's test stands for its ICBM facility at Denver will be back in the foothills, out of sight and sound from the citizens . . . Slick Airways is making 26 trips to Tokyo this month . . . Convair's employment at its Pomona missile plant now is at the 4,000 level and probably will stay in about this range.

• •

In illustrating the short-field efficiency of its Skylark 600 jet transport, Convair points out it can be operated at maximum payloads at every city on TWA's system, but includes provision for O'Hare at Chicago, which is a good tip-off on the future of the Midway airport there . . . Boeing is reported to be taking a look at two engines for a small jet, even though it knows the airlines strongly favor four. Just doesn't want to pass up any bets.

Airlines Report Salaries Of Top Executives

The following carriers have filed with the Civil Aeronautics Board reports listing the 1955 salaries and other compensation of officers and directors:

Pacific Northern Airlines—A. G. Woodley, pres., gen. mgr. & dir., $26,667 salary (up $1,667), $200 bonus & indirect compensation; J. H. Foster, v.p.-eng. & maint., $12,000 salary (up $1,300), no bonus & indir.; J. A. Cunningham, v.p.-oper., & dir., $15,000 salary, $200 bonus & indir.; H. A. Olsen, v.p.-traffic & sales, $12,000 salary (up $900), no bonus & indir.; C. W. Nelson, secy.-treas. & dir., $10,375 salary (up $1,375), $200 bonus & indir.; D. B. Hart, asst. secy., $7,750 salary (up $550), no bonus & indir.; M. E. Diamond, asst. secy., $7,750 salary (up $550), no bonus & indir.; G. O. O'Grady, atty. & dir., no fee, $200 bonus & indir.; R. A. Rowan, dir., no fee, $200 bonus & indir.; Paul Porzelt, dir., no fee, $100 bonus & indir.; M. B. Kirkpatrick, dir., no fee, $200 bonus & indir.

North Central Airlines, Inc.—H. N. Carr, pres. & dir., $23,542 salary (up $9,657), no bonus & indir.; F. M. Buttomer, v.p.-traffic & sales, $11,200 salary (up $1,296), no bonus & indir.; A. E. Schwandt, v.p.-ind. rel., $10,000 salary (up $96), no bonus & indir.; R. H. Bendio, Sr., v.p.-maint. & eng., $10,887 salary, no bonus & indir.; A. D. Niemeyer, v.p.-oper., $11,100 salary, no bonus & indir.; B. Sweet, secy. & treas. $7,925 salary (up $1,728), no bonus & indir.; A. E. A. Mueller, chm. bd., $8,854 salary, $225 bonus & indir.; W. Christensen, dir., no fee, $525 bonus & indir.; G. F. DeCoursin, dir., $600 fee, $450 bonus & indir.; K. B. Willett, dir., no fee, $525 bonus & indir.; R. P. Grover, dir., no fee, $450 bonus & indir.; A. L. Wheeler, dir., no fee, $450 bonus & indir.

Slick Airways, Inc.—Delos W. Rentzel, chm. bd. & chief exec. officer, $30,000 salary, no bonus & indir.

Persons other than officers, directors and employes paid more than $10,000 for personal services were Steptoe & Johnson, legal, $72,324, and Price Waterhouse & Co., audit, $10,000.

Southwest Airways Co.—J. H. Connelly, pres. & dir., $21,000 salary (up $1,625), no bonus & indir.; T. R. Mitchell, v.p., $14,101 salary (up $1,138), no bonus & indir.; A. W. Johnson, v.p., treas. & dir., $13,500 salary (up $1,183), no bonus & indir.; Raymond Costello, v.p. & asst. secy., $9,100 salary (up $380), no bonus & indir.; Max King, v.p., $9,000 salary (down $300), no bonus & indir.

Persons other than directors, officers, and employes paid more than $10,000 for personal services were Abbott Kimball Co., advertising, $14,017.

Riddle Airlines, Inc.—John Paul Riddle, pres. & dir., $20,000 salary (up $10,731), no bonus & indir.; Peter T. Craven, exec. v.p., treas. & dir., $12,233 salary (up $4,034), no bonus & indir.; Jane B. Ramsey, secy., $4,850 salary (up $750), no bonus & indir.; J. William Liversedge, asst. secy. & asst. treas., $7,950 salary, no bonus & indir.; Charles L. Hood, v.p.-sales, $9,675 (up $675), no bonus & indir.; Jack Schopenhaver, v.p.-maint., $10,200 salary, no bonus & indir.; Harry T. Weaver, reg. v.p.-N. Y., $8,100 salary (up $300), no bonus & indir.; Orlando Torres, reg. v.p.-P.R., $9,600 salary, no bonus & indir.; Wm. B. Thompson, reg. v.p.-Washington, $1,200 salary (up $700), no bonus & indir.

Persons other than directors, officers and employes paid more than $10,000 for personal services were: Dixon DeJarnette & Williams, Miami, legal, $10,300; Hal Leyshon & Associates, N.Y.C., pub. rel., $10,500; Harry Bowen, Washington, legal, $12,550.

Los Angeles Airways, Inc.—C. M. Belinn, pres. & dir., $22,500 salary (up $4,500), $2,250 bonus & indir.; John T. Kane, treas., $8,700 salary (up $980), $870 bonus & indir.; Donald L. Litton, asst. secy., (resigned 8/2/55) $2,870 (down $1,267), no bonus & indir.

Reeve Aleutian Airways, Inc.—Robert C. Reeve, pres., $18,000 salary (up $3,000), no bonus & indir.; Robert L. Hanson, v.p., $12,000 salary (up $1,200), no bonus & indir.; Margaret Rutledge, secy.-comptroller, $9,300 salary (up $600), no bonus & indir.; Janice M. Reeve, treas., $12,000 salary (up $3,000), no bonus & indir.

Greenwich, Conn. was the winner of

International Aviation

By Anthony Vandyk

Central African Airways, a well-established and successful operator, seems to have a knack for getting in the news for the strangest of reasons. A few years ago it hit the headlines when its then General Manager caned an air hostess in an effort to discipline her. Recently, Central African has come into the limelight again, as the result of the invasion of one of its Viscounts by a swarm of bees.

Swarms of bees, it seems, are common in Rhodesia and the Viscount wasn't the first Central African Airways aircraft to be involved in an incident of this nature. On the previous occasion, however, the bees were smoked out by directing the exhaust of a jeep to the affected area. In the case of the Viscount, Central African Airways was reluctant to take this course again since it was felt that the smoke might harm the fuel tanks in which the swarm was lodged.

Normal flying operations proved of no avail in ridding the aircraft of the bees. They were subjected to high altitudes but even at 17,000 feet showed no ill effects. In the course of 18,000 miles of proving flights they maintained their excellent health. The ground staff, on the other hand were in less good shape. Some of them were stung every time they went near the "invaded" wing of what they aptly described as "that b . . . aircraft."

A light-hearted suggestion that grated carrots be fed to the bees to improve their night vision and thus enable them to see their way out of their hiding place came to nothing. The only successful device was a vacuum cleaner which, apparently, removed a few of the bees but left the wing occupied by about 70,000.

After all efforts to dislodge the 70,000 had failed, notwithstanding the advice of a professor of apiculture with the unusual name of Penelope Papadopoulos, Central African Airways decided that the only way to get the bees out of the wing was to dismantle it. With Professor Papadopoulos on hand, airline engineers warily removed the wing paneling, drained the tank where the bees were supposed to be and began—very cautiously—to dismantle the tank.

The anti-climatic result was summarized in a cable received by Vickers-Armstrongs from Central African: "Bees already departed, leaving small comb with dozen bees only."

Copter Here to Stay, Says BEA's James

Helicopter enthusiasts must fight the view held in some quarters that the present type of rotorcraft is only a passing phase to be replaced by some type of VTOL or STOL aircraft. This opinion was voiced at a meeting on helicopters of the International Air Transport Association at San Remo, Italy, by Captain J. W. G. James, chairman of the meeting. James, who is Flight Operations Director of British European Airways, declared that the helicopter will be useful for many years to come.

Clear requirements were outlined by operators for two types of multi-engine helicopters—a 25-passenger type and a 40/50-passenger model. The smaller aircraft, operators felt, should have a cruising speed of 100/125 mph for metropolitan operations and 150 mph for inter-city routes. Range should be at least 100 miles. A direct operating cost of not more than 10¢ per available seat-mile was requested.

Operators emphasized that the performance and handling characteristics of these aircraft must be such as to permit safe economic operation into and out of takeoff and landing areas 200 ft. by 400 ft. in size, located in city centers. It was recognized that there may be more than this space available at many heliports, but it was generally agreed that the helicopter will never realize its full potential until it can meet these requirements.

Manufacturers at San Remo were optimistic that they could produce helicopters meeting all of the operators' requirements. They said that 25-passenger models of the type specified would be available in three to five years. Larger models of the 40/50-passenger type are in current development. They could be made available about five years after it was decided to start production, the manufacturers intimated. Such a decision, they stressed, could only be taken on the basis of potential volume production.

Operators replied that if the right helicopter were produced there would be no market shortage—a potential market for 200 in the U.S. alone was confidently predicted.

MANUFACTURING BRIEFS

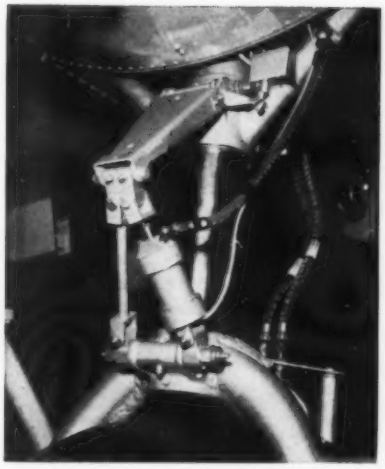
Hamburger Fahrzeugbau will start German license production of the SNCA du Nord 2501 Noratlas in the fall of 1956. The first aircraft is scheduled to be completed 18 months later . . . **Bristol** has named its BE-25 turboprop the Orion . . . **Dassault** has built over 1,000 aircraft since the war. The French company is currently producing about 35 Mystere fighters monthly . . . The **Breguet** Vultur boundary-layer-control experimental aircraft has completed the first phase of its test program.

Following prices have been quoted for British aircraft and engines: Bristol 171 Sycamore helicopter $126,000 (based on an order for eight); English Electric P-1 supersonic fighter, $865,000 (early production version); Avro Vulcan jet bomber, $2,800,000 (based on a 14-plane order); Bristol Olympus turbojet, $140,000 to $182,000 (according to version).

AIRLINE BRIEFS

Italy's **LAI** has ordered six Viscount 770Ds for delivery in 1957. It is also contemplating purchasing eight to 12 **Fokker** Friendships . . . **Canadian Pacific Airlines** has stepped up its Vancouver-Amsterdam service to three flights weekly.

Top technical and operations men of world's airlines flew in SNCASE Caravelle during IATA Technical Conference in San Remo. Two prototypes of French jet transport are currently undergoing flight tests. The first is carrying out proving trials in Air France service.



Geisse safety gear is new optional feature on Beech's 1956 Super 18s. Close-up view (right) shows how cylinder is installed.

Beech Offers Super 18 Crosswind Gear

Beech Aircraft Corp. has taken the wraps off two major design advances, both optional items, for the 1956 edition of its Super 18 executive transport.

• A Geisse safety gear that compensates for crab in a crosswind landing.

• New outboard wing fuel tanks that replace present auxiliary nose tanks and raise fuel capacity from 275 to 318 gallons.

In addition, Beech is including three other items as standard equipment on 1956 eight-place Super 18s. They are 1,000-watt leading-edge landing lights with separate 400-watt taxi-light filaments, all metal flaps and tubeless tires.

Combination Control

• **The new gear** uses a combination of hydraulic and spring control to permit each main landing-gear wheel to caster outward under crosswind landing conditions. The system consists of a hydraulic cylinder and piston which replace one leg of the torque "knee" and a rod fitted with swivel connections taking the place of the other leg.

The torque-knee cylinder is connected to a second cylinder mounted on the airframe and fitted with a spring-loaded piston.

• **In operation** during a crosswind landing, side loads applied to the downwind wheel cause it to caster outward. This compresses the fluid in the torque knee cylinder which, in turn, pressurizes the upper cylinder and compresses the spring which bears against its piston.

With the wheel castered, the aircraft swings to a heading parallel with its flight path. Then as the airplane slows on its landing roll, the side loads on the castered wheel are relieved and the wheel returns to normal alignment.

• **Gear rework kits** are being made available by Beech for conversion of earlier model Super 18s and D18s, except the latter type having oleo-lift-legs.

Beech is not offering conversion kits for the wing-tank installation because of the number of engineering changes in internal structural design and strengthening of the outer wing panel. ◆◆◆

Business Aircraft Compete at Reading

READING, PA.—An all-day rainstorm failed to wash out the seventh annual maintenance and operations meeting of the Reading Aviation Service, Inc. June 2, with more than 100 business aircraft flying in from various points on the Eastern seaboard despite a ceiling that stayed at about 400 feet most of the day. Company officials estimated attendance of owners, pilots and mechanics at more than 500.

Panel discussions were lightly attended because some of the scheduled participants and many of the audience arrived at Reading Municipal Airport from two to four hours late.

• **High spot** of the proceedings was the presentation of Reading Aviation Service Awards to companies and pilots of the outstanding airplanes in single-engine, twin-engine and multi-engine classes.

Owner-pilot R. W. Danielson of Greenwich, Conn. was the winner of the best-in-class prize in the single engine division with his Beech Bonanza.

R. B. Black of Richland Aviation, Inc., Mansfield, Ohio, made a clean sweep of all four prizes—best exterior, best interior, best equipment and instrumentation and best-in-class—in the competition for twin-engined aircraft under 5,000 lbs. with a Piper Apache piloted by A. Clayton Tschantz.

Kewanee Oil Co., Tulsa, Okla. won best-of-class honors in the competition for twin-engined aircraft weighing between 5,000 and 12,500 lbs. with its Beech D18 piloted by Frank Auernig.

The Aluminum Co. of America carried off a handsome trophy when its DC-3 was designated as "Flagship of the Industrial Fleet."

Safety Record Improved

• **At a forum** on operational safety, Jerome Lederer, managing director of Flight Safety Foundation, Inc., offered statistical proof that, despite the sharp increase in air traffic, industrial aircraft have improved their safety record.

The City of Reading was host at an elaborate buffet luncheon which was missed by no one. It was served more than an hour behind schedule because the catering organization was delayed by the heavy continuous rain.

• **Displays** of aircraft products, especially electronic equipment and radar, filled the south half of the main hangar in which the panel discussions and presentation of awards were held.

R. Harding Breithaupt, vice president of Reading Aviation Service, welcomed the visiting owners and pilots and acted as master of ceremonies for most of the activities. George Haddaway, editor of *Flight* magazine, presented the awards.

Crew of Aluminum Company of America's DC-3 that won Reading Aviation Service trophy for business aircraft designated "Flagship of U.S. Industrial Fleet." Seated are Chief Pilot David L. Flannery (right) and William L. Abbott. Standing is William A. Souligny.

Fashion Trend in Aircraft Interiors

Executive aircraft owners' penchant for lush interiors and desire for convenience and comfort have brought a new factor into the aviation industry: the interior decorator. Case in point is the Horton & Horton Custom Works, hangared at Meacham Field in Fort Worth, a husband-and-wife team who are utilizing their artistic talents in glamorizing converted bombers into a lucrative business.

The Hortons' achievements include design of a gold-plated helicopter for Larry Bell; a Beech Bonanza paneled in unborn calf-hide, with curtains fringed with glove suede; a presidential commode installed on a B-25 that sleeps two over a gold storage vault; and a white leather-covered powder room on a De Havilland Dove.

The Hortons were responsible for the interior design for Bell's executive helicopter.

The design boasts under-the-seat insulated drawers for cool drinks, a food locker, and liquor; reclining seat; a "foldaway" desk; leather-covered foot pedals and carpeted floor boards. ◆◆◆

Bill and Dorthe Anne Horton, who make up Horton & Horton Custom Works.

Banco de Mexico's B-25 bears no trace of its bomber heritage as the Hortons turned the bomb-bay into a gold storage vault, topped by a specially designed sleep-seat area.

Patent is pending on aircraft hassock jump seat that springs open for service as an ice box or, if needed, lavatory.

Reclining seat on tracks was feature of Horton designed interior for Bell Helicopter's J model for business users.

In-flight conference desk that folds down to the bulkhead was a Horton creation to provide needed table space in Dove cabin area.

Compact stand was created for Shell Oil Company's Dove to hold cigars, gum, candy, six thermal glasses and insulated chest.

"Neither snow nor rain...

. . . stay these couriers from the swift completion of their appointed rounds." This phrase (you'd be surprised who said it first) sums up a big feature of *United Airlines* new DC-6A Cargoliner® service. (United's customers can be confident that their air shipments are going to travel swiftly, protected from temperature extremes, and be delivered in all kinds of weather.)

In each of these all-cargo aircraft, four Janitrol S-300 heaters provide wing thermal anti-icing, cargo, and cockpit heating. One heater is located in each wing; one under cabin deck, one in the empennage.

If you want to heat the biggest cargo transport, or the smallest business aircraft, or any plane in between, call on Janitrol for the right combination of service-proven heaters, components, and system know-how. Most specifications can be met with standard equipment.

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Janitrol Aircraft-Automotive Division, Surface Combustion Corporation, Columbus 16, Ohio . . . District Engineering Offices: Washington, D. C., Philadelphia, Columbus, Fort Worth, Hollywood.

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COMBUSTION SYSTEMS, HEAT EXCHANGERS, PNEUMATIC CONTROLS

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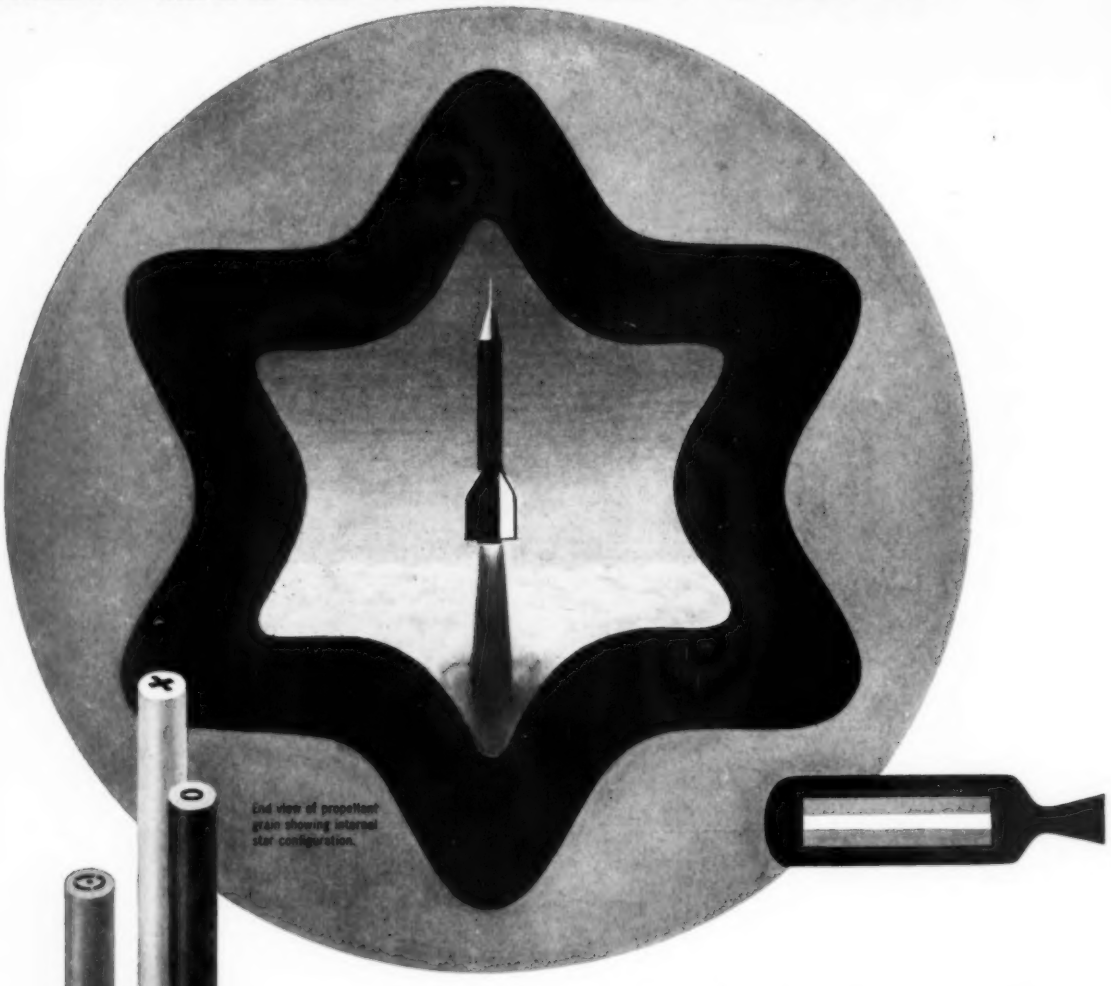
NEW MUSCLES FOR SKY GIANTS



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by Olin

The Olin Explosives Division's leadership in both double-base and composite propellant technology offers designers and engineers "tailor-made" solid rocket power plants. Given your requirements for thrust and duration, an optimization of performance characteristics is made possible through selection from a wide spectrum of propellants.

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TRADEMARK
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EAST ALTON, ILLINOIS

Circle No. 30 on Reader Service Card.

TRANSPORT TRENDS

Washington, D. C., June 18, 1956

ORDERS FOR CONVAIR'S SKYLARK 600 jet transport by TWA and Delta were imminent at presstime. Deliveries will start in 1960. TWA was reported to have ordered 30, Delta 10. Powered by GE J79s, Skylark will gross 173,500 lbs., is designed to operate from 5,000-ft. runways.

●

NATIONAL AIRLINES IS ACTIVELY CONSIDERING Boeing 707 jet transports. It may work out a deal for deliveries in early 1959. At the same time, NAL may follow Eastern's lead and defer Douglas DC-8 deliveries until J75 engines are available. If deal works out, NAL and Pan American would be only U.S. carriers ordering both 707s and DC-8s.

●

AIRLINE THINKING on which engines should power their jets is far from uniform. Eastern and United, both with DC-8s, have switched from Pratt & Whitney's J57 to the bigger J75, principally to get away from water injection. American and TWA so far are sticking with J57s for their Boeing 707s. One factor in switch to J75 may lie in its "growth" factor. Feeling is that J57 will reach the end of the line in development when introduced commercially in 1959. Newer J75, however, may add as much as 5,000 pounds to its 15,000-pound-plus rating in next several years.

●

REPORTS THAT CAB WILL INVESTIGATE "overbooking" by airlines were overplayed. Board is making a routine staff study. There's no formal move to crack down at this time.

●

DECISION ON TRANSATLANTIC FARES by IATA traffic conference meeting in Cannes was close last week. Best guess was that a $425 New York-London round-trip excursion fare would be introduced on Oct. 1, 1956. This would be an interim step, pending introduction of a much lower third-class fare in April 1958. Latter is favored by CAB.

●

ALTHOUGH CONTROVERSIAL ISSUES are far from solved, Air Coordinating Committee is apparently making progress in planning a common civil-military navaid system. Navigation panel has okayed program for development of Navarho long-range aid. This firms up U.S. planning in the face of competition with British-backed Dectra and Delrac systems for global navigation. Approval is also imminent on last and most complex section of Special Working Group 13's report on common system communications. Biggest remaining headache at ACC is final solution of Tacan/DME controversy. Recent ACC meeting on this issue assured future of civil VOR at least through 1965. Next meeting will be June 20.

●

SUPPORTERS OF GENERAL AVIATION have finally realized a united front is needed to get an equal voice with military and airlines in aviation facilities planning. Formation of the General Aviation Facilities Planning Group brings together for the first time pilot, operational, airport, state and manufacturers' representatives. Heretofore, each segment has worked independently. New group can make general aviation much more effective in dealings with federal planners.

TRANSPORT AVIATION

How to Start a Full-Scale Route Case

Get a city excited over its air service "inadequacy" and you've got a proceeding. A case in point: Dallas-to-West Service.

By WILLIAM V. HENZEY

THE MOST EFFECTIVE method of starting a major route proceeding before the Civil Aeronautics Board currently is for a city to express dissatisfaction with the adequacy of present airline service and request a formal investigation.

And the best example of how far a city-instituted route case can go is the pending Dallas-to-the-West Service Case which, depending upon a CAB vote, could become a full-scale southern transcontinental route case.

Thirteen airlines have submitted applications to be tried in the case. Some want the proceeding confined to CAB's originally-stated limits, namely, between Dallas and major California cities. Dallas itself wants the case limited to that area.

Houston, however, has asked CAB for an investigation of its air service to and from California and on a transcontinental basis. Some airlines support Houston's proposal and would like to have it linked with the Dallas case in one big coast-to-coast proceeding.

• **Notable among those** pushing for expansion to a transcontinental case is CAB's own staff, which participates in economic proceedings as Bureau Counsel. The major airline vote cast for expansion is that of Eastern Air Lines, long an aspirant for a transcontinental route and the only member of the Big Four without such a route.

Eastern's last bid for extension to California was turned down five years ago when, in contrast with the present era of route expansion, the prevailing atmosphere was against route extensions and in favor of temporary interchanges as a substitute. That case, known as the Southern Service-to-the-West Case, served as a policy guide for CAB on route matters until last year when the lid was removed on domestic route extensions.

Eastern's Proposals

• **Eastern proposes** three routes for inclusion in the new case: (1) extension of present Route 5 beyond New Orleans to San Francisco/Oakland, via Dallas and points in Arizona and California; (2) same route, only via Houston; and (3) a new route between Miami and San Francisco/Oakland via various intermediates.

Among the other airlines, some favor expansion and some oppose. Many opponents, nevertheless, have filed "defensive" applications for transcontinental service just in case CAB agrees to expand the proceeding. Following are the applications, in addition to Eastern's, which could be considered in a transcontinental case:

• **Western Air Lines** proposes a San Francisco/Oakland-Dallas route via Los Angeles, plus another route extending from California to Houston and another from California to Miami.

• **National Airlines,** now participating in a southern transcontinental interchange service with American Airlines and Delta Air Lines, proposes extension of its trans-Gulf route beyond New Orleans to Houston, Dallas, and San Francisco/Oakland via various intermediates, if the case is expanded.

• **American,** the only carrier now serving Dallas-California, proposes a route from Seattle to Dallas/Fort Worth via major cities in California, Arizona and Texas.

• **Braniff Airways** applied for extension from its Texas cities to San Francisco/Oakland.

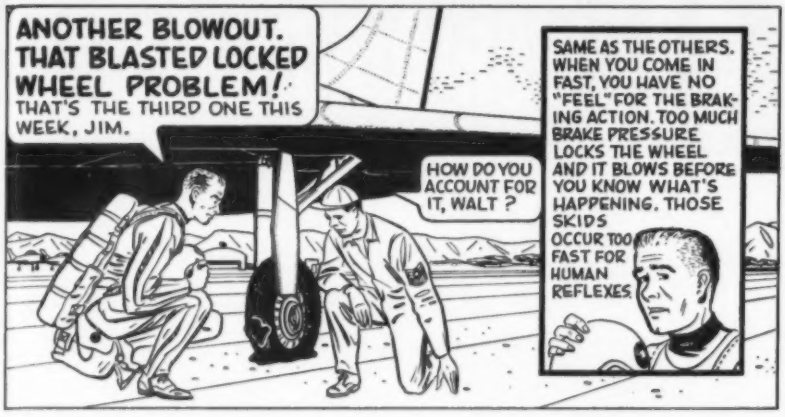
• **Continental Air Lines** proposes a Dallas-California route and one from San Francisco/Oakland to Houston and Miami.

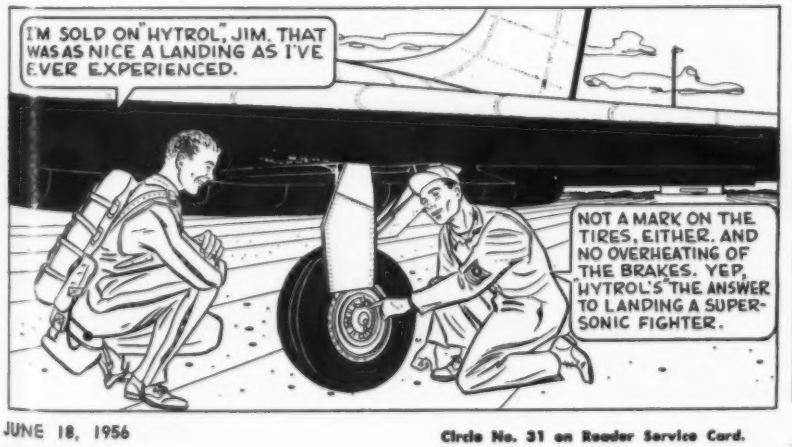
• **Delta,** if the case is expanded to transcontinental proportions, wants a Dallas-California extension via various intermediates and **Trans World Airlines** seeks lifting of the restriction on its service between Los Angeles and San Francisco/Oakland.

• **California Eastern Airways** and **Trans American Airlines** have both advanced southern transcontinental proposals and three local service carriers—**Frontier, Trans-Texas,** and **Central**—

Eastern, Colonial Complete Merger

Colonial Airlines has become a division of Eastern Air Lines following consummation of merger of the two companies. Thomas F. Armstrong (left), president of Eastern, and Branch T. Dykes, CAI president who becomes vp of new Colonial Division of EAL, look over merged air route system. Armstrong holds a share of Eastern stock, one of which was exchanged for each two shares of Colonial.





propose new area routes within or adjacent to their current routes.

Could Be Biggest Case

In all, it could shape up as the biggest route case of the decade if CAB votes to expand it beyond the Dallas-west coast area as its staff recommends. Even without expansion it will rank in size with the major route cases of the past nine months.

A prehearing conference has been held on issues to be considered if the proceeding is limited to the area between Dallas and California. Next step is a Board decision on the expansion proposals. If expanded, the case very likely will require a second prehearing conference before moving on to hearings.

But it all serves to emphasize the power of the city-inspired proceeding. In past years, new route cases got their origin from route applications filed by individual applicants. However, with over 1,000 applications pending, considerable time necessarily would elapse before CAB could get around to hearing an application.

• **There is** an emergency ring to a city application, however, that complains of inadequate air service. Even if CAB didn't concede the point, any major city can garner strong Congressional support for its case and CAB has a difficult time resisting the resulting Congressional requests.

In short, a city application can get expeditious treatment where an individual applicant can't. Baltimore, St. Louis and Fort Worth are other cities which have prompted or seek to prompt new airline route cases.

The avenue thus open for airlines, under this modern method, is to file an application with CAB, then go to a city on the route named in the application and try to get the city to file for an investigation.

If the city follows through and an investigation is started, the airline simply files with CAB to have its previously-filed application consolidated with the new investigation. ◈◈◈

SELLING THEIR PRODUCT

U.S. Airlines Spent $15.6 Million Last Year in Newspaper Advertising

The 13 U.S. trunk airlines and Pan American World Airways spent more last year for newspaper advertising than did bus lines, railroads and steamship companies combined, and also exceeded the total for hotels and resorts. They came close to equaling newspaper expenditures for cigarette and beer ads.

These airlines spent a substantial $15,651,984 for newspaper space, a 28.5% jump over 1954 and 154.4% ahead of 1951, according to data prepared by the Bureau of Advertising, American Newspaper Publishers Association.

The five-year advertising growth has been as follows: 1952 was 15.2% ahead of 1951, 1953 was 26.5% over 1952, 1954 gained 35.8% over 1953, and 1955 showed a 28.5% gain over 1954.

• **Compared with** the $15,651,984 spent by the 13 trunks and PAA, expenditures of bus, rail and steamship totaled $13,429,000, while hotels and resorts were $14,379,000. ANPA's Bureau of Advertising lists cigarette ads in newspapers at $17,259,000 and beer at $17,021,000.

Six of the airlines are now among the top 100 newspaper advertisers, and are climbing steadily in the rankings. Three of them are among the top 100 national advertisers using newspapers, magazines, network TV and outdoor.

• **Biggest airline** newspaper advertiser is Eastern Air Lines, with $3,400,639 last year. EAL ranked 20th among the top 100, compared with 22nd in 1954. American ($2,697,004) ranked 28th, up from 38th the year before. United ($1,690,172) jumped from 77th to 58th, TWA ($1,675,558) from 78th to 59th, PAA ($1,355,172) from 82nd to 74th, and National ($1,130,551) from 92nd to 84th.

EAL spent nothing for magazine, network TV or outdoor advertising. Its $3,400,639 newspaper total ranked 84th among the top 100 national advertisers.

In 85th place was American, with $2,697,004 in newspapers; $619,691 in magazines, nothing for network TV, and $49,102 for outdoor, for a total of $3,365,797.

• **TWA, in 94th place,** spent $1,675,558 in newspapers, $1,217,934 in magazines, nothing for network TV, and $113,217 for outdoor, totaling $3,006,709.

The ANPA Bureau of Advertising figures cover 948 weekday newspapers in 729 cities and towns, representing 91.7% of total circulation in communities of 10,000 or more population. Also included are 360 Sunday papers and 327 towns, representing 95.3% of total circulation. Expenditures do not include advertising production costs. ◈◈◈

How Airlines' Newspaper Advertising Has Grown

	1955	1954	1953	1952	1951
American Airlines	$2,697,004	$2,133,662	$1,043,985	$ 828,129	$ 693,168
Braniff	488,453	389,308	416,071	387,443	178,682
Capital	898,017	435,970	440,378	597,445	496,264
Colonial	174,858	109,391	100,358	78,992	64,067
Continental	239,157	160,591	146,609	96,681	110,078
Delta	698,345	671,975	730,082	410,464	416,637
Eastern	3,400,639	2,819,776	1,884,118	1,248,145	892,810
National	1,130,551	1,003,189	910,519	783,970	692,371
Northeast	42,784	57,142	47,878	94,260	125,071
Northwest	829,346	600,805	515,350	338,508	324,879
Pan American*	1,355,172	1,130,703	1,070,800	892,298	972,783
TWA	1,675,558	1,167,061	619,376	616,618	556,996
United	1,690,172	1,173,936	741,659	611,599	498,986
Western	331,928	329,535	304,016	105,277	129,038
TOTAL	$15,651,984	$12,183,044	$8,971,199	$7,089,829	$6,151,830

* Pan American total includes PAA, Panagra, joint PAA-Panagra ads, and Avianca.

Boeing Proposes Jet For MATS Operation

Boeing Airplane Co. is proposing a military version of its 707 jet transport that would displace the Military Air Transport Service's fleet of 104 C-97s with only 21 jets.

At the same time, a Boeing study shows, the change to jets would result both in operational and cost advantages to MATS.

Boeing's proposal is the model 707-326, a 295,000 to 310,000-pound version of the commercial 707 Intercontinental powered by Pratt & Whitney J75s.

In one year's operation on MATS transatlantic and transpacific routes, Boeing estimates, the 707-326 would eliminate entirely some 11,967 intransit stops. Crew member requirements would drop from 1,544 to only 239 and total flying hours would be sliced from 153,000 to about 31,000.

WHEN A PILOT NEEDS A LANDMARK...

Circled portion of aeronautical chart as seen on scope of AVQ-10 on in-bound airliner (Note Hayward-San Mateo County bridge).

Portion of sectional aeronautical chart looking north on San Francisco Bay area.

the exceptional ground-mapping properties of RCA's Weather Radar will spot his position

Air carriers find RCA's new Weather Radar (AVQ-10) invaluable in making landfalls and recognizing landmarks under adverse weather conditions in areas where navigation aids are comparatively inadequate.

The AVQ-10 provides a crosscheck on normal navigation methods, enabling the pilot and navigator to determine their position with great exactness relative to the coast line. This is equally true on inland routes where topographical features show up clearly on the scope. The AVQ-10 also helps to locate the proper entry point in defense areas, where aircraft are limited to "corridors."

These ground-mapping characteristics are in addition to the recognized superiority of the AVQ-10 as a weather radar. It is the first airborne radar to use the C-band (5.6 cm) transmission, the wavelength best suited to weather detection and avoidance, yet having the least amount of scope clutter. With it, the pilot can evaluate storms up to 150 miles ahead and pick non-turbulent paths between them. In addition to avoiding costly detours, the AVQ-10 contributes materially to passenger comfort.

All this has made the demand for the AVQ-10 great and pressing. Many leading airlines have already specified it. To secure early installation, other airline and executive plane operators are invited to write now for further information.

CUSTOM AVIATION EQUIPMENT

RADIO CORPORATION of AMERICA

11819 W. Olympic Blvd., Los Angeles, Cal.

Vanguard Moves into Medium-Haul Market

Vickers changes design features of V.900 turboprop to increase range; wing tankage boosted for 135,000 lbs. gross weight.

By JAMES HAY STEVENS

LONDON — Vickers-Armstrongs has changed the design features of the V.900 Vanguard turboprop transport to make the aircraft attractive to medium-haul airlines—particularly U.S. transcontinental operators—as well as short-haul operators.

Vanguard originally was closely tailored to the BEA shorthaul network (200-1,000-mi. stages, some small airports, highly seasonal traffic) and had a gross of around 108,000 lbs.

Integral wing tankage was increased so as to give a capacity-payload still air range of 3,150 statute miles (2,600-mi. stage), wing and flap areas being increased so that the new maximum gross of 135,000 lbs. could be lifted from a 6,000 ft. runway (I.S.A. sea level atmosphere).

Visible changes in the Vanguard since the first announcement: introduction of double taper on the wing trailing edge to allow fitting large parallel-chord Fowler flaps; kinking of the windshield to improve pilot visibility; lengthening of fuselage tail cone to smooth airflow at tail surface juncture, and finalizing of engine nacelle form.

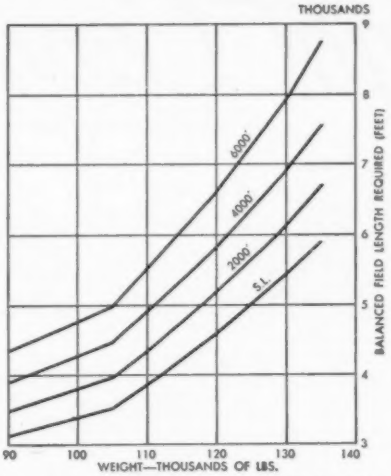
Linked with RB109

• **Development** of the V.900 and the Rolls-Royce RB109 Tyne projects has always been closely linked. As revealed last fall, the latter had top-mounted twin oil coolers in anticipation of a high-wing airliner. In production form, as the Tyne, the oil coolers will be underneath the main air intake and the cowls will be of a slim oval cross-section. Jet exhaust will be ducted over the wing and the under part of the nacelle will be carried back to the wing trailing edge by fairings on the flaps.

The inner nacelles will be bulged considerably to enclose twin-wheel main gear. This was chosen in preference to bogies in order to shorten ramp time by allowing ground turning radius with one leg as pivot.

• **Design emphasis** throughout has been on rapid turnaround. Pressure fueling points will permit unloading the full tank capacity of 6,120 U.S. gals. in 8½ minutes. Oil and passenger water will also be pressure-loaded from the ground, while the toilets will be emptied and replenished from outside too.

Flaps, gear, non-skid wheel brakes and nosewheel steering will be operated by a 3,000-psi hydraulic system. There will be no high-pressure pipes in the



Vanguard's maximum take-off weight for take-off distance available and emergency distance available are shown in this chart. Powerplant would be the 4,600-shp version of the Tyne (development stage 2) with water methanol injection.

pressure fuselage and, by simply changing the seals, non-inflammable fluid may be used. Either of the two pumps, mounted on #2 and #3 engines, can supply full power for the system.

There will be a flap emergency circuit, while the gear will have free-fall lowering. The passenger stairs will have an independent electro-hydraulic system that will be off-load in flight, while the stairs will push out in an emergency. Wings will be thermally anti-iced by hot air from jet pipe heat exchangers; propellers, intakes, tail and control surfaces will be electrically de-iced.

• **Electrical services** will be fed by a 28-volt dc system from starter/generators on each engine. The system has been designed to give full rated voltage on half load when the engines are idling and to supply all necessary services at the taxiing rpm of 8,000.

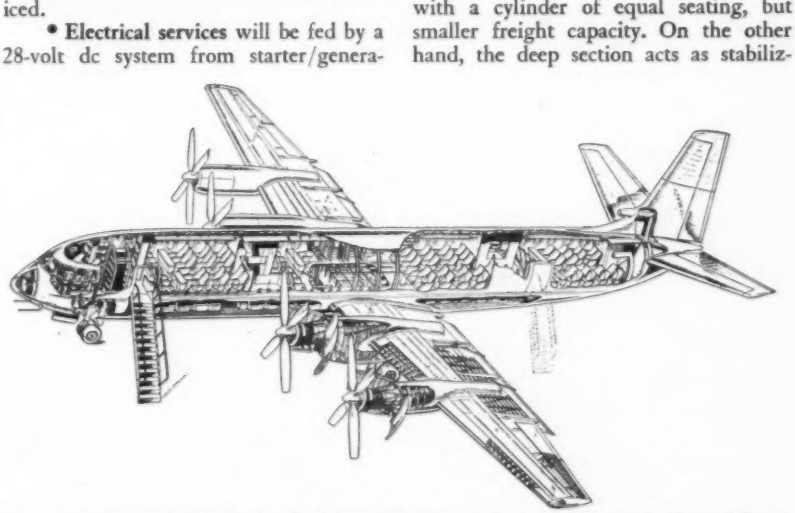
The pressurization system will be supplied by blowers on #2 and #3 engines, either of which will be able to deliver the full supply of 150 lb./min. at 6½ psi at 30,000 ft. This rate changes the cabin air every 2½ minutes. Cockpit and cabin will have separate air supplies and each passenger will have a controllable cool air louver. The air-conditioning circuit will operate on the ground and there will be a standard cart connection.

Accommodation is intended to set a new high for regional liners. The passenger deck is divided into three cabins, positioned well clear of propeller and jet noise sources, with a large elliptical "Viscount" window at each seat pitch of 39 inches.

Cockpit layout is for two crew, either two pilots or pilot and "third crewman" on a seat behind the central control console. Crew space is the largest since the Stratocruiser and the nose is so wide that the pilots enter their seats from outboard. Windshield panels are exceptionally deep, using the largest size of safety glass fabricated in Britain, and the pilot's view should be well above average.

Clean Aerodynamic Design

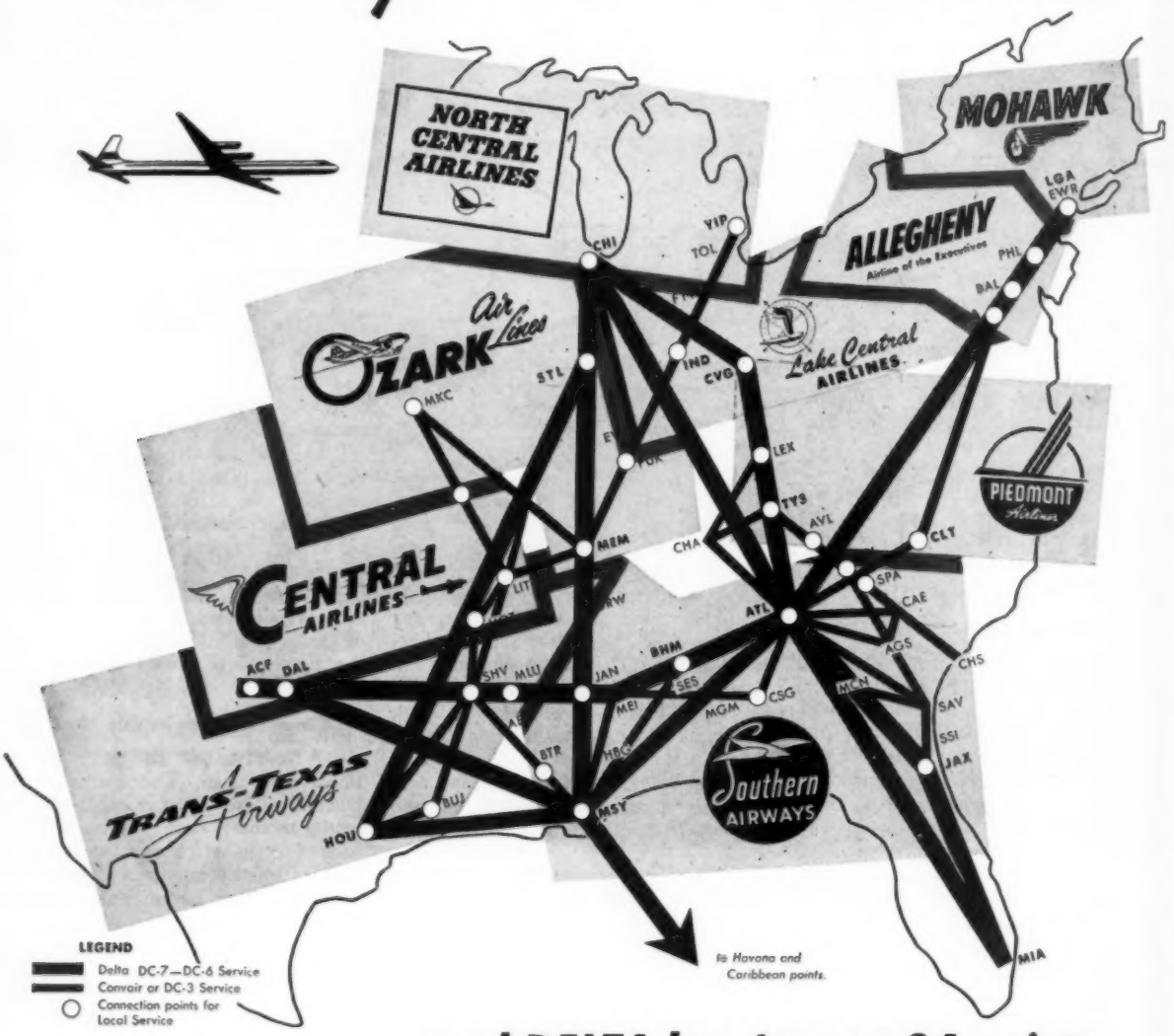
• **Aerodynamic design** is conventional but clean. The increased skin friction of the double-bubble is estimated to cost 4 or 5 mph as compared with a cylinder of equal seating, but smaller freight capacity. On the other hand, the deep section acts as stabiliz-



This cutaway shows double-bubble fuselage of the Vanguard, chosen because it gives minimum fuselage length for about 115 passengers with exceptional amenities plus larger holds than could be incorporated in an equivalent conventional cylindrical fuselage.

You can really go places with

the Right Connections!



and DELTA has 'em at 34 points with 9 of the finest Local Service Lines

Now that Delta has expanded service to include New York, Philadelphia, Baltimore, Washington and Charlotte, there is greater opportunity than ever before for cooperation with local service airlines. Delta serves 60 cities in 7 countries — and Delta passengers have access, through the Local Service Lines, to 215 more. Cultivation of this exchange is good business both ways.

One of America's Pioneer Scheduled Airlines

Delta AIR LINES

General Offices: Atlanta Airport, Atlanta, Georgia

ing side area but little dorsal fin is required. The high aspect ratio fin/rudder are supplemented by the lateral projection of the dihedral tail plane—itself initially chosen to clear the jet and flap wake.

Manually-operated controls with aerodynamic balance were chosen by Vickers-Armstrongs' chief designer Basil Stephenson. Ailerons, in three sections to cater for wing flexing, have sealed pressure balances with geared balance tabs and spring tabs; the elevators have inset hinges and horn balances plus spring tabs; while the two-piece rudder has horn balances and spring tabs only. Dynamic and static balancing follows normal practice.

• **Structural design** is conventional, being based largely upon Viscount experience, except in one important instance, the wing. Established British practice of separate spars has been abandoned for a true torsion box with an integrally-machined skin.

The Vanguard torsion-box design consists of three plate webs having light boom sections for the attachment of the skin. The skin panels themselves will be machined from 25 ft. x 2 ft. 6 in. x 2½-in. slabs of light alloy (24 ST4 type) so that they will taper in thickness and have very close-pitched spanwise stiffeners. The wing will be a one-piece unit, but built as five components, center section, inner planes and outer planes—plus of course, detachable tips.

The inner planes will have three skin panels, side by side, and the outer ones two. Main ribs of the box will be machined from the solid and will form the tank ends and strong points. Intermediate ribs will be part pierced plates and part tubular girders, with deep-section booms notched to take the skin stiffening ribs.

The main gear is to be attached to the front and rear webs of the torsion box in such a way that the wheels should clear the lower skin in the event of a collapse.

The Fowler flaps will run on rollers on steel rails and will be actuated by torque tubes operated from a single jack in the center section. ◈◈◈

USAF Awards Logair Freight Contracts for '57

Fiscal 1957 Logair domestic freight contracts have been awarded by USAF's Air Materiel Command to Resort Airlines, Riddle Airlines, American Export & Import Co., and Capitol Airways. Contracts are for one year, with two one-year renewals, depending on requirements, availability of funds and performance.

Resort won the C-54 contract, with an estimated minimum volume of 43.7 million ton-miles assured.

C-46 contracts went to Riddle, AAXICO and Capitol, with combined guaranteed minimum tonnage of about 113 million ton-miles.

AA Offers 'To-Your-Door' Baggage Service

"To-your-door" downtown baggage delivery service has been introduced in New York and Los Angeles by American Airlines.

The service is available in four New York boroughs—Manhattan, Queens, Brooklyn and the Bronx. On the west coast, it is offered in Los Angeles, Hollywood, West Hollywood and Beverly Hills. There is a delivery charge for each bag.

Passengers flying the non-stop Mercury can check bags upon departure at the airports (or at New York's East Side Terminal) and the luggage will be delivered to the designated downtown address on the opposite coast. On other flights, passengers can arrange for the service upon arrival at destination.

In New York, if the bag destination is between the Battery and 86th St. in Manhattan, the rate is $2 for the first bag and $1 for each additional. For all other destinations, charge is $3 and $1.50. Los Angeles is $2 and $1. Beverly Hills, Hollywood and West Hollywood are $3 and $1.50.

Charge is collected when the bag is delivered to the in-town address. In the case of hotels, charges can be paid by the hotel and added to the bill.

New York service is provided by Carey Limousine from Airports to East Side Terminal and by Mercury Service Systems to the in-town destinations. Airportransit Inc. and Atlantic Transfer Co. are used in Los Angeles.

Donald Douglas to Get Elmer Sperry Award

The 1956 Elmer A. Sperry Award is to be presented to Donald W. Douglas "in recognition of his distinguished engineering contribution which has advanced the art of transportation through the development and production of the 'DC' series of airplanes."

The award is sponsored by American Society of Mechanical Engineers, American Institute of Electrical Engineers, Society of Automotive Engineers and Society of Naval Architects and Marine Engineers.

Cargon: New Airfreight Handling System

By ANTHONY VANDYK

A system that enables cargo to be carried more cheaply by air than by surface transport is attracting serious attention of U.S. commercial and military operators. Known as Cargon, this simple cargo-handling system already has proved itself in New Zealand and is to be adopted by one of the world's major freight-carrying airlines, Australian National Airways.

Ian H. Grabowsky, Planning and Development Manager of ANA, said: "I have been so impressed with the Cargon system that I consider all future cargo aircraft should be designed around the Cargon system." He describes it as "the only cargo-handling system that while effecting direct economies can, at the same time, increase productivity."

Using the Cargon system, loading an aircraft is almost as simple as sliding the ice tray into a refrigerator. Basically the system comprises wheeled trays that can be pre-loaded and then slid into the aircraft. These trays, or pallets, to use the technical term, are loaded into the aircraft or unloaded from it in a mater of minutes. Not only are cargo handling costs lowered because of this, but the aircraft's ground time is reduced to the minimum, thereby increasing productive revenue flying hours.

In New Zealand, where the Cargon system has been given its first practical operating test, it has been found easy to unload 12,000 lbs. of cargo and load the same quantity, all in a turnaround time of 20 minutes. The Cargon system is used by New Zealand Railways to move freight between the North and South Islands. A Bristol 170 Freighter shuttles ten times a day between airports at the tips of the two islands carrying 24,000 lbs. payload on each round trip.

• **New Zealand Railways** has estimated that use of the Cargon system has reduced loss and damage by 81% as compared with that suffered in use of surface transport between the two islands. This is quite understandable since with the Cargon system, correct stowage (heavy items at the bottom, light on top, etc.) can be effected at the point of origin and remains untouched until arrival at the ultimate destination. The pallet on which the load is carried is slid from one warehouse to another, from one vehicle to another.

In the United States operators are learning about the Cargon system from Col. Robert W. Johnson, president of Cargon Transport Inc., Washington, D.C. Hardman Tool & Engineering Co., Los Angeles, is interested in manufacturing the system and is submitting a proposal to American Airlines for the conversion of AA's fleet of DC-6A aircraft to Cargon. The system would enable unitized cargo to be loaded and off-loaded through the aft cargo door of a DC-6A within an elapsed time of 10 minutes, using not more than two men.

While Cargon could substantially increase the efficiency of a DC-6A, the system will not be used to its best advantage until it is part of a fully integrated complete transport operation. This would require cargo aircraft of uncompromised design (standard truck-bed height, straight-in end loading, level floor, constant section, etc.), integration of air lift with other modes of transport through the capability of ready interchange of unit cargo loads, separation of airfield facilities as between cargo and passenger traffic, etc.

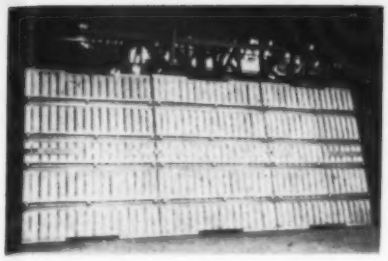
Nonetheless, the Cargon system would do a good job on all types of aircraft currently used for cargo work in the U.S. The dimensions of the pallet, for use in this country, are to some extent dictated by State laws. Usually road vehicles are not allowed to carry a load more than eight feet wide. Four feet seems an acceptable width for one unit. In the matter of length there is much more latitude. Cargon experts urge that the length should not be less than 80 in. and should be increased in 40-in. multiples. Compromises on the latter dimension should, preferably, be made in 8-in. increments in order to provide a modular base for the development of packaging and handling systems.

In the case of the DC-6A, the maximum unit length limitation is the width of the aft cargo door—124 in. The total length to be considered for "Cargonizing" in a DC-6A is 440 in.

• **Modification** of an aircraft for the Cargon system requires a short time—probably not more than two hours. The Cargon rolls under ledges—one on either side wall of the aircraft. Fore and aft restraint for the DC-6A, for example, would be provided by means of pins which engage the longitudinal edge of the Cargon with suitable holes in the ledges.

The current version of the Cargon measures 5.1 in. in depth with about 4 in. taken up by the wheels on which the unit is mounted. It is hoped to be able to mount the Cargon on wheels of smaller diameter and greater width in the future, since vertical dimension is a critical factor in the best use of the

Cargon "tray" rolls from its truck into aircraft (left). When clamshell doors are shut, adjustable stop seen on far left comes up snugly against Cargon. Entire load, car and all (right), rolls into capacious fuselage of Bristol 170 in seconds.



Cargons are basically aluminum pallets running on small wheels. Weight of unit as manufactured in New Zealand is about 3.5 lbs. per sq. ft. It is stressed to about 115 lbs. per sq. ft. If manufactured in U.S. (by Hardman Tool & Engineering Co.) weight would probably be reduced and strength upped to about 200 lbs. per sq. ft.

Cargon in current aircraft.

The Bristol 170 Freighter, as used for the pilot Cargon operation in New Zealand by Straits Air Freight Express, is almost ideal for the use of the system. It would be completely ideal if it had a tricycle gear instead of main and tail-wheel type. It enables all cargo handling operations to be performed on a common level—truckbed height—thus eliminating the need for vertical movement.

The Frye Corporation is aware of the potential of Cargon and has designed the F-1 Safari transport to take the system. Consultations took place recently between president Jack Frye; Thomas O'Connell, head of Straits Air Freight Express and inventor of Cargon; and Colonel Johnson, president of Cargon Transport Inc.

Col. Johnson sums up the advantages of Cargon in the following terms: "It produces substantial direct operating economies by reducing the number of transport vehicles otherwise required to perform the same amount of carriage when conventional loading methods are used; by reducing manpower requirements through the elimination of multiple handlings; and by greatly increasing the utilization of all transport vehicles. . . . Here, indeed, is a practical method of integrating the use of airlift as a normal means of transport into our national transportation complex." ◈ ◈ ◈

Douglas Raises Prices Of DC-6A and DC-6B

Price increases of about $150,000 per plane were put into effect June 15 by Douglas Aircraft Co. on the DC-6A and DC-6B.

This represents the first increase in DC-6 prices since 1952, and reflects recent wage boosts and other higher costs. The new prices: DC-6A, $1,275,000; domestic DC-6B, $1,345,000; overwater DC-6B, $1,450,000.

SUMMARY OF U.S. DOMESTIC AIRLINE REVENUES & EXPENSES FOR QUARTER ENDED MAR. 31, 1956

(Compiled by American Aviation Publications from official CAB data.)

AIRLINES	TOTAL OPERATING REVENUES	PASSENGER REVENUES	MAIL REVENUES	EXPRESS REVENUES	FREIGHT REVENUES	FEDERAL SUBSIDY	NON-SCHEDULED TRANSPORT REV.	TOTAL OPERATING EXPENSES	AIRCRAFT OPERATING EXPENSES	GROUND & INDIRECT EXPENSES	NET OPERATING INCOME BEFORE INCOME TAXES
American	$ 62,486,843	$ 55,733,643	$ 1,606,484	$1,094,195	$ 3,227,371	$ . . .	$ 40,732	$ 57,157,660	$ 27,156,847	$ 30,000,813	$ 5,329,183
Braniff	10,535,833	9,707,347	235,299	135,550	255,075	. . .	35,635	9,822,365	4,796,075	5,026,290	713,468
Capital	11,872,867	10,909,714	282,263	231,024	240,181	. . .	60,087	13,402,833	6,182,084	7,220,749	-1,529,966
Caribair	490,405	433,490	4,793	. . .	14,387	. . .	22,485	356,254	141,830	214,424	134,151
Colonial	1,691,753	1,491,806	24,060	9,813	40,240	100,797	4,103	1,818,559	725,769	1,092,790	-126,806
Continental	4,401,516	3,720,176	100,553	34,949	103,752	340,616	6,307	4,137,487	2,186,500	1,950,987	264,029
Delta	16,525,953	15,055,082	341,768	251,188	429,240	. . .	13,742	14,128,101	7,290,378	6,837,723	2,397,852
Eastern	58,724,217	55,223,895	1,030,878	504,097	651,074	. . .	18,778	46,024,288	27,428,844	18,595,444	12,699,929
Hawaiian	1,084,977	841,842	9,385	. . .	154,768	60,180	1,791	1,190,419	489,097	701,322	-105,442
National	17,262,997	15,838,549	298,100	90,095	362,920	. . .	70,370	12,947,380	7,138,114	5,809,266	4,315,617
Northeast	1,956,558	1,349,461	24,686	19,989	28,117	502,602	2,879	2,308,877	1,004,712	1,304,165	-352,319
Northwest	10,816,301	9,482,552	382,725	245,558	468,376	. . .	1,320	11,755,692	6,144,676	5,611,016	-939,391
Trans-Pac.	391,906	351,297	2,159	. . .	14,641	12,774	863	493,699	192,728	300,971	-101,793
TWA	37,355,088	33,691,837	1,039,605	803,150	1,182,348	. . .	108,054	40,171,039	21,519,909	18,651,130	-2,815,951
United	54,267,993	47,354,494	2,259,162	1,108,172	2,106,331	. . .	241,180	53,432,689	24,717,981	28,714,708	835,304
Western*	1,403,675	1,282,151	33,855	16,085	22,684	. . .	18,460	2,980,592	1,214,318	1,766,274	-1,576,917
TOTALS	291,268,882	262,467,366	7,675,775	4,543,865	9,301,505	1,016,969	646,786	272,127,934	138,329,862	133,798,072	19,140,948

* Operations were suspended from January 9, 1956, to March 22, 1956, because of strike.

SUMMARY OF U.S. INTERNATIONAL AIRLINE REVENUES & EXPENSES FOR QUARTER ENDED MARCH 31, 1956

(Compiled by American Aviation Publications from official CAB data.)

AIRLINES	TOTAL OPERATING REVENUES	PASSENGER REVENUES	U. S. MAIL REVENUES	FOREIGN MAIL REVENUES	EXPRESS REVENUES	FREIGHT REVENUES	FEDERAL SUBSIDY	NON-SCHEDULED TRANSPORT REV.	TOTAL OPERATING EXPENSES	AIRCRAFT OPERATING EXPENSES	GROUND & INDIRECT EXPENSES	NET OPERATING INCOME
American	$ 1,532,483	$ 1,288,729	$ 13,568	$ 28,870	$ 459	$ 152,944	$ . . .	$ . . .	$ 1,211,053	$ 528,244	$ 682,809	$ 321,430
Braniff	1,818,180	1,281,432	48,809	49,749	. . .	92,867	251,365	. . .	1,726,751	799,585	927,166	91,429
Colonial	233,139	206,290	1,318	. . .	. . .	3,491	13,337	. . .	353,781	138,450	215,331	-120,642
Delta	1,262,931	1,164,357	14,842	2,270	. . .	52,390	. . .	. . .	1,198,520	592,154	606,366	64,411
Eastern	3,075,488	2,899,800	66,599	. . .	. . .	46,115	. . .	. . .	2,091,705	1,343,159	748,546	983,783
National	1,361,225	1,263,523	9,788	106	4,803	16,250	. . .	8,512	863,594	351,690	511,904	497,631
Northwest	5,456,366	2,966,157	1,339,393	150,627	15,096	885,012	. . .	50,936	5,557,494	2,667,569	2,889,925	-101,128
Panagra	4,896,628	3,643,270	95,721	138,615	. . .	416,351	5,077	17,882	4,408,222	1,940,389	2,467,833	488,406
Pan American												
Latin Amer	21,184,405	15,292,395	473,415	290,646	. . .	2,468,345	1,538,114	157,003	20,545,685	9,304,940	11,240,745	638,720
Atlantic	21,894,741	15,262,979	1,597,539	724,873	. . .	2,010,762	441,609	957,106	23,805,566	11,590,240	12,215,326	-1,910,825
Pacific	15,233,807	11,128,340	1,455,431	459,568	. . .	1,422,132	116,280	354,749	14,178,106	7,074,635	7,103,471	1,055,701
Alaska	1,427,696	673,189	40,090	. . .	. . .	156,924	351,099	187,795	1,788,412	854,913	933,499	-360,716
TWA	11,142,931	7,963,578	1,193,822	541,910	. . .	842,979	. . .	193,358	14,373,461	6,361,876	8,011,585	14,373,461
United	2,738,267	2,475,942	102,166	. . .	. . .	36,093	. . .	60,790	2,455,726	1,226,434	1,229,292	282,541
TOTALS	93,258,287	67,509,081	6,452,501	2,387,234	20,358	8,602,655	2,716,881	1,988,131	94,558,076	44,774,278	49,783,798	16,304,202

Contracts

Recent contract awards announced by the Commerce Dept. are listed below. Unless otherwise specified, they are USAF contracts:

Pratt & Whitney Div., United Aircraft Corp., E. Hartford, Conn., $33,676,013, to manufacture J57-P-23, -P-21 and -P-5 jet engines for Navy.

Curtiss-Wright Corp., Wood-Ridge, N. J., $19,140,000, J65-W engines, and Caldwell, N. J., $8,649,516, propeller assemblies.

Minneapolis-Honeywell Regulator Co., Minneapolis, $9,897,654, MB-3 automatic flight control systems.

North American Aviation Inc., Fresno, Calif., $6,423,555, advanced electronic kits for F-86s, and $2,656,800, kits for extended, slatted leading edges of F-86s.

Luria Steel & Trading Corp., New York, $9,841,560, aircraft servicing docks.

Magnavox Co., Ft. Wayne, Ind., $5,343,-067, radio receiver-transmitters.

Hallicrafters Co., Chicago, $4,804,782, radio transmitters.

General Electric Co., Schenectady, N. Y., $1,115,313, modification of G3H autopilot components.

Hughes Aircraft Co., Culver City, Calif., $2,340,000, control surface tie-in components for F-86s.

Continental Aviation & Engineering Corp., Detroit, $5,121,974, gas turbine-powered air compressors, and $3,081,582, J69 jet engines.

Remington Rand Univac Div., Sperry-Rand Corp., St. Paul, Minn., $1,124,946, switches, transformers, other parts for airborne radio equipment.

Sundstrand Machine Tool Co., Rockford, Ill., $1,844,187, transmission and gear box assemblies.

Cubic Corp., San Diego, Calif., $1,899,-910, increase in delivery schedule of missile tracking equipment for Patrick AFB, Fla.

Contracts announced by companies:

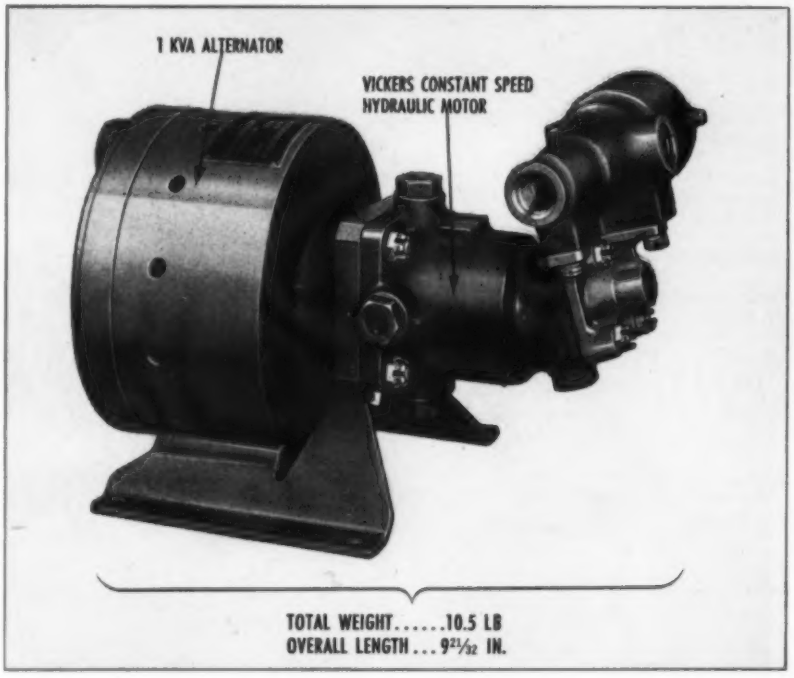
Bell Aircraft Corp., Ft. Worth, Tex., $2,483,022, additional development contract for Army XH-40 helicopter.

New Vickers Airborne Electrical Power Package

. . . Saves Weight and Space

Utilizes the Hydraulic System for More Efficient Production of AC Power

This new isolated electrical power package provides closely regulated AC power with minimum weight and envelope while drawing its power from a hydraulic system. In new designs or when adding electronic equipment to aircraft designs in which the electrical system is already loaded to capacity, this versatile package provides the needed AC power from flow available in the hydraulic system. This generally is permissible without system change as the full flow is seldom demanded except for a few seconds under rare circumstances. Even in such cases, full flow can be guaranteed to these hydraulic functions through the use of a simple priority valve which starves the AC power package momentarily.



Less Weight and More Efficient

Important weight savings are achieved through the use of this package instead of an inverter which may also require an increase in the AC generator and line capacities. In one instance, the 10.5 lb 1 kva package replaced a 38 lb inverter for co-pilot instrumentation. An additional advantage is that the package has 62% overall efficiency while that of the inverter was 35-40%.

Extreme altitude operation is no problem as the Vickers isolated electrical power package contains no brushes or other altitude-sensitive components.

Features of AC Generator

The permanent magnet type AC generator has excellent life and reliability. It requires no bulky voltage regulator . . . is inherently smaller and lighter than conventional generators due to the elimination of the exciter and slip rings. It also has higher overall efficiency resulting from elimination of all excitation losses. Additional advantages are that the permanent magnet is unaffected by momentary short circuit, or separation of field and armature without keeper, or by temperature cycling. It is also not susceptible to aging or shock. This unit is 120/208 volt, three phase, wye connected with 400 cps at 8000 rpm. It is capable of continuous duty under environments of 0-55,000 feet altitude and ambient temperatures from −65 F to 250 F.

Hydraulic Motor Drive

The generator is directly driven by a Vickers Constant Speed Hydraulic Motor having fixed stroke and an integral flow control valve that maintains an 8000 rpm speed setting within ±2½% regardless of the load (as long as valve inlet pressure is greater than load requirement). For the unit shown above, maximum operating pressure is 3000 psi while rated output of 1 kva requires operating pressure of 2200 psi. Special configurations will maintain 400 cps frequency within ±0.1% regardless of load. This motor has a very high horsepower-weight ratio and its overall efficiency exceeds 92%. It is a time-proved design capable of many hundreds of hours of continuous service without attention.

Many Uses and Sizes

The applications for this isolated power source are numerous. For multi-engine aircraft, its use for co-pilot instruments provides dual reliability. This package has been used to supply controlled frequency AC power in emergencies when the only source of power in the airplane is a ram air turbine driven pump. The efficiency of this arrangement minimizes the size and weight of the ram air turbine necessary to provide emergency hydraulic and electric power.

Now available in the sizes listed below, larger packages can also be supplied from existing components. Vickers is prepared to develop the package best suited to a specific need. For further information, get in touch with your nearest Vickers Aircraft Application Engineer.

Vickers Airborne Electrical Power Packages

kva output	weight, pounds
0.5	7.0
1.0	10.5
1.5	12.5
2.0	15
2.5	17
3.0	19

Larger capacities with minimum weight are available.

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7492

Boeing cabin mock-up designed for jet-age travel

This life-size mock-up of the Boeing Jet Stratoliner cabin was designed to provide an interior as modern and advanced as the 600-mile-an-hour performance of the aircraft itself.

Ninety-eight standard seats, with 40-inch spacing, are provided, along with lounges forward and aft for 10 extra passengers. The seats, in two- and three-abreast sections, are set in floor tracks. This feature makes possible quick changes of seat spacing, in one-inch stages, and permits four-, five-, and six-abreast seating in any desired combination. A complete changeover requires only an hour.

Because there are twice as many windows in this cabin as in any airplane now flying, there is never a problem of seats out of phase with windows. This arrangement also gives all passengers, even in innermost aisle seats, an unobstructed window view.

Reading-light and forced-air controls, "seat belt" signs, and an individual speaker are located in units suspended from the hat rack. These units, which tend to compartmentalize the cabin, can be snapped out for inspection or repair. They are infinitely adjustable in location to conform to any seating arrangement. All ceiling and wall surfaces are in washable plastic, in panels that can be pulled out, or snapped back, in minutes, greatly speeding up structure inspection and maintenance.

These features – and many, many more – will bring jet-age advantages to both operators and passengers. Eight major American and European airlines have already ordered fleets of Boeing jets: Air France, American Airlines, Braniff International Airways, Continental Air Lines, Lufthansa-German Airlines, Pan American World Airways, Sabena Belgian World Airlines and Trans World Airlines.

This Boeing is the only American jet transport proven by a flight-tested prototype. It benefits, too, from Boeing's unique background of experience in designing, building and flying more large, multi-jet aircraft than any other company in the world.

BOEING

Airline Commentary

By Eric Bramley

United Air Lines firmly believes that one of the best ways to get a man's travel business is to know his secretary. And it's so much the better if she's familiar with your service. So a couple of weeks ago UAL brought a DC-7 to Washington and operated two courtesy hops for secretaries only. This was strictly a red carpet deal—orchids for the ladies, cocktails and hors d'oeuvres aloft—and a subtle reminder that it would be nice if the boss flew the Mainline. Our spies aboard tell us it was beautifully handled. More than 100 gals made the flights and about a dozen of them were first-riders. UAL makes similar flights in other cities when it has DC-7 time available. An A-1 idea.

* * *

Speaking of courtesy hops, we made one on American Airlines' Royal Coachman, the DC-7 coach version now in non-stop transcontinental service. AA has come up with an unusually attractive interior—blue, red and copper. Seats are very comfortable. At $99 one-way New York-Los Angeles, this is a good travel buy.

* * *

It's amazing how "scoops" on aviation developments turn up from time to time in Broadway gossip columns. Trouble is, they're invariably wrong. Latest involves a hot item that the Post Office Department is readying a fleet of "flying mail cars." This item was hot 10 years ago, when it was under consideration. Idea was discarded and it's dead—and has been for 10 years.

* * *

Odds and ends: One of the real old-timers has retired. He's Capt. Harry Huking, of United Air Lines, and the company says he's the "nation's senior-most airline pilot in point of continuous flying." He's been with UAL and predecessors since 1927, has racked up more than 29,000 hours . . . The air travel plan is 20 years old. Congratulations to the "inventor," Charlie Speers, American's senior v.p.-sales . . . Airlines are now studying a new no-show penalty plan. They'll meet in Chicago June 20 to vote on it . . . Smoothest landings we've experienced recently were on Northwest Airlines, whose captains really know how to put those Stratocruisers on the ground . . . Airline officials spend a tremendous amount of time serving on industry committees. Western Air Lines, for example, points out that it now has 20 men on Air Transport Association committees . . .

Sales, Traffic, Promotion

Of all the people in the U.S. who are 15 years of age and over, 17.3 million took a trip of 1,000 miles or more in one direction within the U.S. last year, and 7,550,000 made a trip outside the U.S., according to a new survey by Alfred Politz Research Inc., sponsored by *Look*. Of the 17.3 million, 12,050,000 used an automobile going to their destination on the last trip they took during 1955, and 11,750,000 returned by auto. Two million went by plane, with 2.3 million returning; railroads carried 2 million going and 1,950,000 returning. Internationally, the airplane hauled 1,150,000 in each direction, leading train, bus and boat substantially. Top spot, however, went to the auto (to Canada and Mexico). Survey was conducted on an area probability sample basis in 4,772 households. More information available from *Look*, 488 Madison Ave., New York. . .

Delta's eye-catching direct-mail postcard features a menu, with the notation: "Reserve your steak when you make your reservation; just tell the ticket agent how you want it: rare, medium or well . . ."

Mary Gordon, **TWA's** travel adviser, has prepared a series of leaflets covering many phases of travel. One is titled "Let's Talk About Stretching Your Travel Dollar." Other "Let's talk about" subjects are thrift season travel, traveling solo, shopping abroad, traveling with tots. Available from ticket offices, travel agents or TWA women's sales division, 380 Madison Ave., New York. . .

Capital Airlines is now using passenger service managers. These trouble-shooters are on duty in front of airport counters at company's six largest stations: LaGuardia, Chicago (Midway), Detroit, Cleveland, Pittsburgh and Washington. . .

Swissair's interline publication points out that the Swiss airline now has an agreement with Russia's **Aeroflot**, and that trips to Russian points now can be sold. U.S. airlines, wrestling with the no-show problem, will be interested in Swissair's note on Aeroflot's policy: full fare is refunded if cancelation is made up to three hours before departure. For cancelations made after this deadline and for no-shows, 25% of the one-way fare to the next stopover of at least six hours is collected. Maximum no-show charge is 280 rubles ($70), minimum 28 rubles ($7). . .

Scandinavian Airlines System has opened its own kitchen near Los Angeles International Airport to service polar flights. SAS formerly obtained catering service from the Brown Derby restaurant. . .

National Airlines' successful "Millionaire's Vacation on a Piggy Bank Budget" now includes South America, through NAL-Panagra-PAA interchange. Complete 28-day tour around South America can be made for $285 plus air fare. . . **Braniff Airways** has created an eastern sales region, headed by H. H. Murphy Jr., with headquarters in New York. . .

Southern Airways opened new downtown ticket offices in Memphis (lobby of Peabody Hotel) and New Orleans (700 Common St.) . . . **Allegheny Airlines'** flight personnel and ground crews will have new blue-gray worsted sharkskin single-breasted uniforms this fall, made by Airwear, division of Lyon Tailoring, Cleveland. . .

United Air Lines' training program for ticket and telephone sales agents has produced its 5,000th graduate. Program started in 1951 in Chicago. UAL also has schools now in New York, Los Angeles and San Francisco. . .

Trans-Canada has designed a new filing system for reservations which it says has attracted attention of several U.S. lines. It entails use of standard reservations cards containing all data pertinent to the individual passengers. Cards are punch-coded according to flight number, date of flight, month of travel and ticket purchase advice. The system of filing cards in flight containers where pre-set rods match their punched codes makes it easy to check them visually for accuracy, TCA says. This reduces time spent previously in checking the files card by card. . .

Sabena Belgian World Airlines has announced a series of eight tours to Russia this summer. They'll be operated in conjunction with Tom Maupin Tour Associates, Lawrence, Kansas, working in cooperation with Intourist, Russia's travel agency. Example: one tour leaves June 18, conducted by Alex Dreier, news commentator. Cost is $1,750 per person for 18 days, eight of which are spent in Russia. And a "ladies only" 17-day trip leaves Sept. 1, priced at $1,787 each. . .

New airport scale for weighing passenger luggage is being marketed by Triner Scale & Mfg. Co., 2716 W. 21st St., Chicago. Scale has two lights, a green one indicating regular weight baggage, and a red one that automatically flashes when weight exceeds the free limit. A musical chime also registers when bags are overweight.

to career-conscious **ENGINEERS:**

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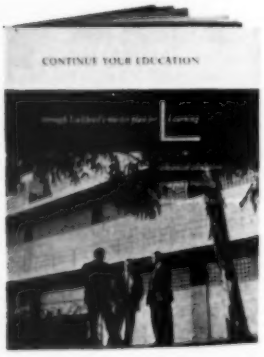

Engineers interested in advancing their education and career will find Lockheed's new brochure, "Continue Your Education" of interest. It details day and evening programs open to engineers at the University of Southern California, University of California at Los Angeles and at Lockheed. Coupon below is for your convenience in requesting the brochure.

The work of today's aircraft engineer is becoming ever more complex.

His position and career require constantly increasing theoretical and practical knowledge. His intellectual and professional curiosity demand educational growth.

This "need to know" is welcomed at Lockheed. It is a vital factor in Lockheed's engineering leadership. It is the basis of untold engineering achievements.

To help engineers in their quest for knowledge, the California Division of Lockheed has developed a comprehensive series of training and scholarship programs. They are adapted to Lockheed engineers in all fields, at all levels.

Within this Master Plan for Learning, every engineer will find a program best adapted to his requirements.

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SUMMARY OF U.S. LOCAL SERVICE AIRLINE REVENUES & EXPENSES FOR QUARTER ENDED MAR. 31, 1956

(Compiled by American Aviation Publications from official CAB data.)

AIRLINES	TOTAL OPERATING REVENUES	PASSENGER REVENUES	MAIL REVENUES	EXPRESS REVENUES	FREIGHT REVENUES	FEDERAL SUBSIDY	NON-SCHEDULED TRANSPORT REV.	TOTAL OPERATING EXPENSES	AIRCRAFT OPERATING EXPENSES	GROUND & INDIRECT EXPENSES	NET OPERATING INCOME BEFORE INCOME TAXES
Allegheny	$ 1,226,740	$ 748,804	$ 23,337	$ 27,118	$ 3,188	$ 399,879	$ 11,587	$ 1,459,895	$ 639,244	$ 800,651	$ -233,155
Bonanza	676,532	389,521	8,727	5,930	8,457	244,843	14,461	721,991	326,985	395,006	-45,459
Central	781,447	229,594	9,242	4,014	7,686	525,234	1,231	788,520	341,854	446,666	-7,073
Frontier	1,500,522	816,652	30,499	11,441	47,381	583,553	486	1,421,656	618,293	803,363	78,866
Lake Central	636,384	263,527	7,991	16,077	. . .	347,476	402	668,164	284,412	383,752	-31,780
Mohawk	1,051,302	836,898	10,366	10,430	15,170	158,166	14,136	1,235,629	589,686	645,943	-184,327
N. Central	1,729,784	1,214,433	41,438	45,249	. . .	415,521	3,136	1,715,326	835,898	879,428	14,458
Ozark	1,176,291	616,375	26,483	15,616	. . .	508,307	3,118	1,289,150	606,245	682,905	-112,859
Piedmont	1,532,855	969,277	24,128	12,284	13,351	479,077	7,420	1,750,492	820,816	929,676	-217,637
Southern	898,665	430,321	19,245	13,727	. . .	413,638	14,425	928,138	408,605	519,533	-29,473
Southwest	980,085	649,925	22,352	9,599	14,854	236,666	41,128	1,121,504	567,145	554,359	-141,419
Trans-Texas	1,302,551	627,297	24,019	11,701	22,047	606,260	1,525	1,330,226	607,426	722,800	-27,675
West Coast*	855,047	456,716	13,666	5,047	7,710	363,972	5,107	988,283	456,573	531,710	-133,236
TOTALS	14,348,205	8,249,340	261,493	188,233	139,844	5,282,592	118,162	15,418,974	7,103,182	8,295,792	-1,070,769
Helicopter Mail Services											
HAS	119,246	. . .	16,902	. . .	. . .	98,234	. . .	118,926	60,898	58,028	320
Los Angeles	264,635	20,028	32,535	21,721	. . .	186,935	925	260,307	154,497	105,810	4,328
N.Y. Airways	429,498	50,459	7,501	7,489	6,116	355,277	1,383	405,876	186,304	219,572	23,622

* Figures for West Coast Airlines are tentative.

TRANSPORT BRIEFS

• **Bonanza Air Lines** ordered three F-27 turboprop transports from Fairchild Engine & Airplane Corp. and took an option on three more. Deliveries are scheduled for early 1958. Fairchild now has firm orders for 11 F-27s and options for 13.

• **"Aggressive expansion"** of coach service is promised by Braniff Airways this fall. DC-7Cs will offer mixed-class (coach and first-class) service, and company is also modifying its DC-6s to dual configuration with 16 first-class seats in the rear compartment and 48 coach seats forward.

• **CAB granted Southern Airways** a five-year extension of its local service routes beyond Atlanta to Panama City, Fla., via Columbus and Dothan. Atlanta-Panama City non-stops are permitted provided two daily round-trips are scheduled to the intermediates.

• **British Overseas Airways Corp.** expects gross deficit of $4.2 million in the fiscal year ended Mar. 31, 1957, compared with $4.9 million profit in its last fiscal year. Although revenues will be up, expenses are also increasing, and there will be "abnormal costs" resulting from introduction of new equipment (Britannias and DC-7Cs).

• **Court review** of CAB's decision authorizing some airlines to operate a "deferred" airfreight service has been asked by Railway Express Agency. The service involves rates comparable to surface rates for an operation slower than normal airfreight but faster than surface transport.

Not $85,000 Contract

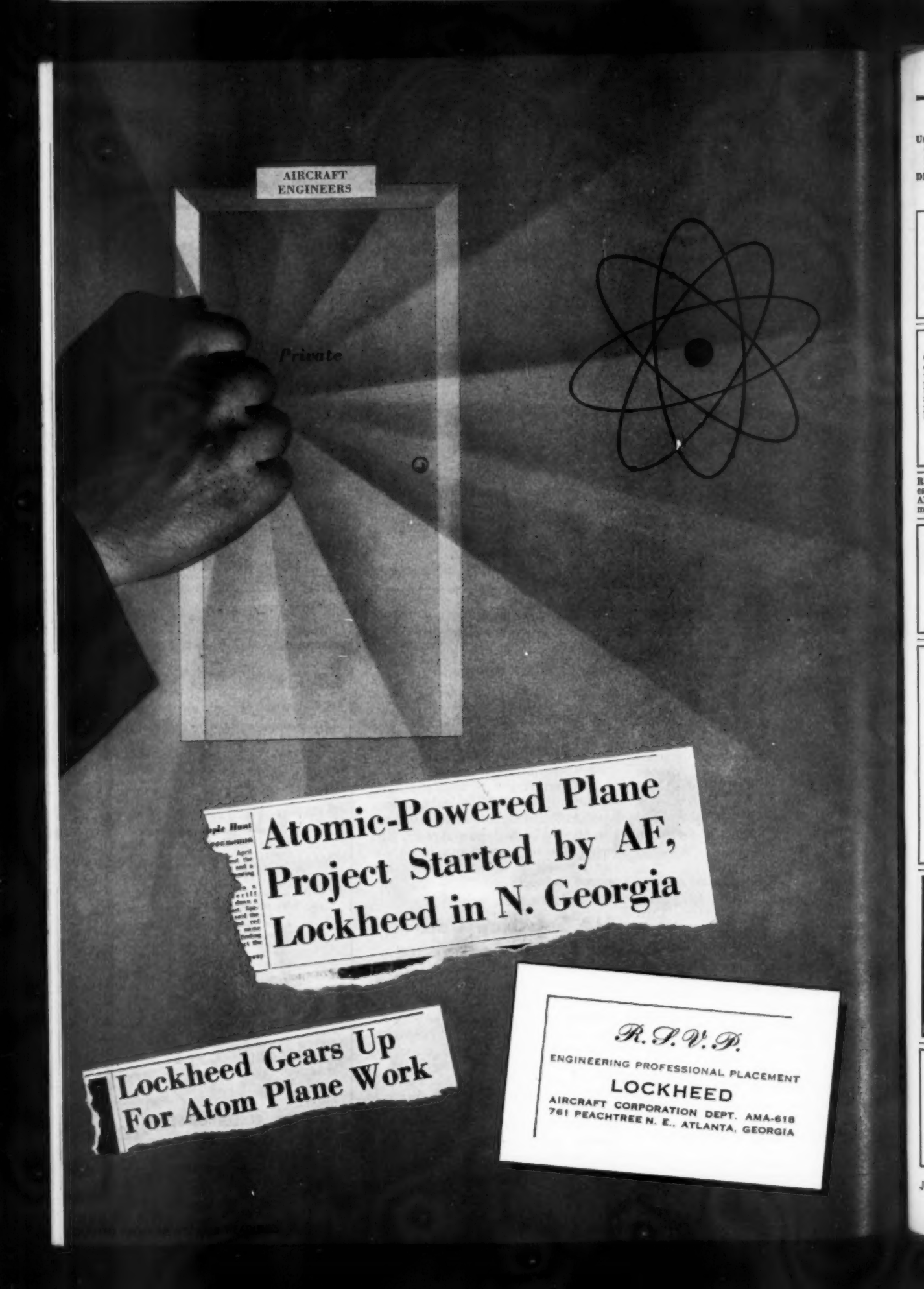
Corrected figure announced by Vertol Aircraft Corp. for its contract to develop a tilting wing VTOL aircraft (AMERICAN AVIATION, June 4, p. 29) was not picked up at presstime.

Contract awarded by Army and Office of Naval Research totals $850,000, not $85,000 as first announced.

AIA Sets New Date For Export Conference

Aircraft Industries Assn.'s long-postponed export conference with military and civil aviation officials of Latin American countries is now scheduled for Nov. 14-15 in Miami, Fla. Purpose is to promote exports of U.S.-made airline equipment to Latin America.

Originally scheduled for Feb. 24-25, the meeting was called off unexpectedly by Adm. DeWitt C. Ramsey, AIA president, because it was felt the conference plans required further study. The postponement led to resignation of R. W. Swanson, Convair's Washington representative, as chairman of AIA's export committee.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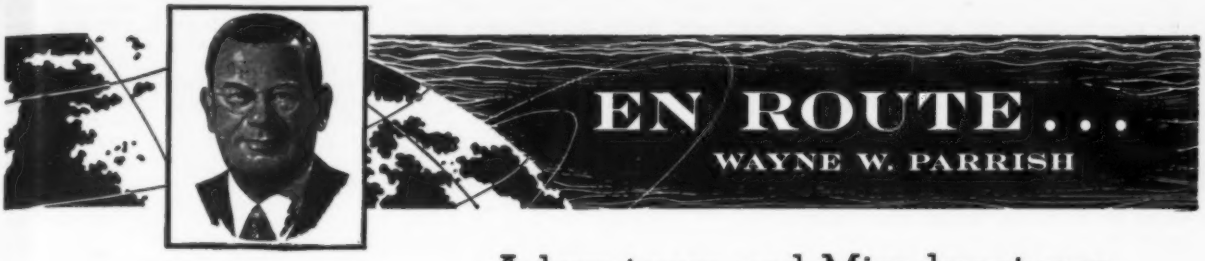


Adventures and Misadventures In Russian Hospitality

My one and only chance to partake of some high-level hospitality by Russians in Moscow turned into a shambles.

Staying at the National Hotel on a business trip was an American whom I will call Mr. X connected with plush restaurant activities in New York. He was in Moscow to purchase caviar and other Russian specialties from the sea. I saw him a number of times. One day he said he was giving a party for various American radio and news correspondents and asked me to join up.

I went to his suite at the appointed time and learned that we were to be entertained at dinner by some reasonably high level people in the ministry dealing with food to celebrate closing the deal. This was indeed a break. I wanted to experience one of those much-publicized Russian affairs even if I had to be carried back to the hotel.

Mr. X had plenty of liquid refreshments on hand so I had a scotch and soda. He also had a plate of fresh fruit which must have been hard to come by and most expensive. Several correspondents had already arrived. Mr. X was drinking straight scotch and obviously had started some time earlier. I wondered how he could go out and start all over again on a vodka diet. The time came to leave but it was always "let's have another short one—we'll leave in two minutes."

Finally we got under way. We picked up Ludmilla, the interpreter, at the Intourist office, but Mr. X delayed our departure for awhile by arguing vigorously about a car bill he thought was exorbitant.

Many-Splendored Restaurant

Quite late, we arrived at the Praga restaurant, a new multi-floor, marble-walled and many-roomed restaurant which is the pride of Moscow. Our five Russian hosts were waiting. They were sober.

We were taken in an elevator to a private dining room, quite large and light, with a long table fixed up for a royal banquet, flowers and all. One of the veteran correspondents told me that this was "the works," the finest layout that can be provided in Moscow.

By the time we arrived Mr. X was flying high on straight scotch. No sooner had we sat down than he started singing. The vodka was poured and kept coming. Several of the Russians endeavored on numerous occasions to make a toast, presumably to peace and undying friendship, but the voluble Mr. X never let anybody finish a toast. Several times he tried to give a toast himself but got awfully mixed up as to where he was. In due course he not only succeeded in issuing some rather undiplomatic remarks unfavorable to his hosts' country but began using some choice words not found in the dictionary. Ludmilla sat next to the top Russian translating everything—or as much as she understood.

A string orchestra from the Caucasus was brought in and frankly, I thought the music was excellent. It had a fast tempo. Mr. X decided it was time to dance, so he put a handkerchief on his head and put on quite a solo performance. One of the Russians, a short, stocky mustached guy with broad smile and gold teeth, got into the act and danced Russian style quite expertly. He was really good. The Russians were doing their best to humor Mr. X.

Meantime, the rest of us—joined by more American correspondents who had attended a Yugoslav embassy reception before coming to the Praga—stopped drinking and watched the inevitable collapse of Mr. X, who continued to drink straight vodka on top of his large reservoir of scotch. He ate nothing. He bottomed-up and even poured vodka on his head. The correspondents were taking photos like mad. I managed to eat most of my food and it was quite good, but the dinner turned into a disorderly spectacle, including broken glasses.

"X" Marks the Spot

Finally the Russians who were doing their best to honor their recalcitrate guest, presented a big box of caviar and other delicacies to Mr. X at which point he promptly fell into some potted palms. A decision was made to take Mr. X back to the hotel. With very considerable effort he was helped into the elevator, and into his coat, and into a small car. One of the Russian hosts went with him. From what I gathered he began up-chucking quite steadily on the way back. (How to make friends with taxi drivers!)

I returned to the hotel with some of the others, arriving just after Mr. X was lifted into the hotel lobby and into the elevator. He was completely helpless with clothes in disarray. There was a circle of hotel help and guests gathered around to see Mr. X in what approached a death scene.

Up in his room a group of us helped get him into bed, and pondered the behavior of human beings. It was generally agreed that Mr. X deliberately set out to get drunk. Maybe he decided early against participating in toasts. If he set out intentionally to insult his hosts. he succeeded with a bang.

That night I would have wagered heavily that Mr. X would never make the airplane early next morning on which he was booked to Helsinki and beyond to New York. But thanks to a couple of correspondents he was awakened, dressed and dispatched, all in the atmosphere of a hangover, no tips, complaints and derisive remarks about the U.S.S.R. I heard it was quite an explosive departure, one not designed to improve relations anywhere.

Nevertheless, sometime, I'd like to return to the Praga restaurant. It's very expensive and only for the elite. But it is brightly lighted, it has an inside garden, several orchestras, and is an effort to provide a little gaiety in otherwise drab Moscow. I'm sure it's the top place to eat.

Tidbits from Notebook

Here are some tidbits from my notebook:

There are no telephone directories in Moscow. Lots of phones, but you have to make up your own list of numbers.

I found out that telephoning to the U.S. was easy. I gave the Washington number to the Intourist office. In less than a half hour the connection was made. It was very clear. Moscow-U.S. calls can only be made late in the afternoon. No more expensive than from western Europe.

The laundry at the National varied from excellent to awful. One handkerchief came back with 40 recognizable holes in it, but the shirts were well done. Laundry is the least expensive item in the Soviet Union.

Muscovites are crazy about ice cream. Standing in the snow in bitter cold they'll buy ice cream cones from a street stand. Ice cream is pretty good and usually is available in vanilla and chocolate. But it's expensive, about 60¢ for a cone or small dish.

It is very difficult to get a driver's license in Russia. You have to be a mechanic, almost, plus knowing the language. There are all sorts of written tests requiring a lot of preparation. Only a few Americans have been able to acquire them. All the others hire Russian drivers.

Tourism is nothing new to Russia. In 1934 and 1935 over 60,000 American tourists and businessmen visited Russia. Many went there on cruise ships.

There are no city maps, guide books, or lists or descriptions of things to see. I believe Intourist, however, has some tourist aids in preparation.

The abacus, an instrument for performing calculation by sliding counters along rods or in grooves, is used almost

exclusively for accounts and figuring out your change. It's as fast as an adding machine. There are countless numbers of these ancient calculators used in Russia.

An English theatrical company produced Hamlet (in English) when I was there. It was a hit. On opening night it was televised. Every maid in my hotel was glued to the set on our first floor lounge. Many others dropped in to watch it, too, even though few could understand English. On the small Russian TV screen, the quality wasn't too good.

The American embassy owns a dacha, or summer cottage, about twenty miles north of Moscow. Lt. Col. William Adams drove me out there in the snow one day. It is in pleasant surroundings. On the way we passed many wooden dachas owned by Muscovites. You can't own land in Russia and you can't build your own home in town, but if you rate high enough you can lease land from the state in the country and put up your own dacha as a place for holidays and summer gardens.

There are 170 nationalities in the U.S.S.R., and many languages. Moscow is a tourist mecca for people from all over the country so the passing scene is a fascinating parade of many types of people.

There was more lipstick to be seen on women than I had expected. It is pretty much all one shade. Those who use it are still in the minority.

Study in Contrasts

And here are some observations which I gathered from a variety of sources who know something about Russia:

Opening up the country to tourists is just another of many signs that the new collective leadership has gained confidence in itself and its ability to run the Soviet Union.

Russia is a study in contrast. Some things are done very well, others very poorly. Everything is on a priority basis. Less important things are sacrificed.

The U.S.S.R. is now the second largest industrial nation in the world, next to the U.S.

Soviet policies remain about as they were, but it is unlikely that the new leaders could tighten up people and internal operations as before. There has been a definite easing of security activities.

There is an increase of nationalistic feeling—the revitalization of Old Russia. This comes with greater confidence.

The U.S.S.R. has built an industrial nation on top of the old, and left the old unimproved. This has created a food problem and a lot of the latter is due to poor distribution.

If Russia could solve its food problem, it would make much progress. Then it will have conquered everything except its heavy-handed bureaucracy, and that's next to impossible. The Soviet Union is stuck with state socialism, probably for good.

Lack of consumer goods means there's always a threat of inflation. It has inflationary troubles now.

The Soviet Union has emphasized education, with training from early ages for specific work. There is no general liberal arts education.

The Russian people admire and respect the U.S.A., but this sometimes means envy and in some instances actual hate. On the whole there is much friendliness evident.

My week in Moscow was coming to a fast close. The time of decision had arrived.

There have been few times in my life when I've felt so forlorn as the time came to leave for Kiev and Odessa. More than once I was ready to throw in the towel and return to Finland. But I had come this far. The arrangements were made. So I decided to go ahead, come what may, even though I was getting pretty lonesome.

A complicating factor was that my itinerary called for flying from Odessa to Bucharest, capital of Romania. My visa hadn't come through. Some young guy at our embassy at Moscow had tried to get it for me there but without success, although I don't think he tried very hard nor did he give the full story to the Romanian embassy. (I found out on my return that my visa had arrived the day after I left, so I was, in fact, accepted.)

The Aeroflot plane for Kiev departs at the ungodly hour of 5:55 a.m. This meant that I had to go to bed early. I was awakened at 3:45 a.m., and was picked up by an Intourist Zis car at 4:30. It was, of course, pitch dark. It was snowing. A late party was still going on somewhere in the National Hotel. I could hear a piano and some beery singing. The snowplows were out and so were the women snow shovelers. It was 15 or 20 miles to the airport and we passed a number of cars. Moscow airport operates all night long.

A red glow in the low cloud ceiling indicated the airport long before we arrived. I noted a long tree-lined promenade leading up to the terminal. A porter took my bag and I followed him through the rather small waiting room with its wooden benches and a few local passengers. We went direct to the outgoing international room for checking in. My baggage weighed more than the domestic allowance and a girl agent demanded some money but an Intourist representative stepped up to argue my side and won his point that I was on an international ticket which entitled me to higher allowance.

The Intourist chap, quite friendly, took me upstairs to the restaurant for a light breakfast. I had a roll and cocoa and gave the waiter a five-ruble bill ($1.25). By gum if he didn't keep the whole works. I wandered back downstairs and looked around the waiting room and noted the departure board which indicated about 30 flights per 24-hour period leaving Moscow for many points.

Then I went to the departure lounge which was carpeted and furnished with upholstered furniture, and looked over my fellow passengers. I was on a flight bound for Budapest. I assume my fellow passengers were mostly Hungarians. No westerners to be seen anywhere. A few minutes before flight time a tall uniformed agent called the flight and we streamed out to board our 21-passenger I1-12. This was my second flight with Aeroflot.

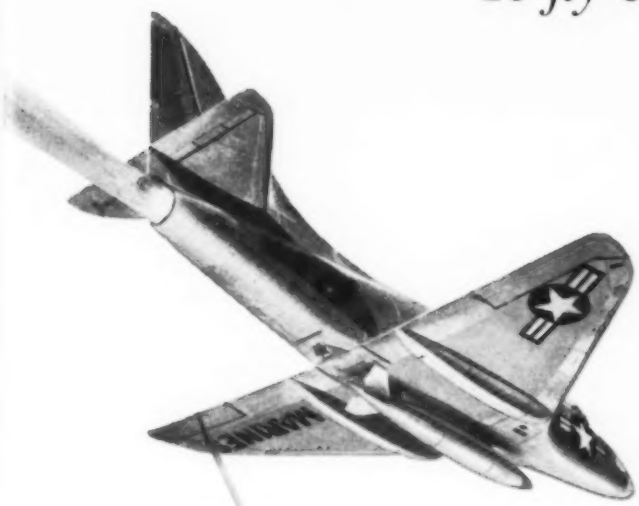
There was a stewardess, the first I'd seen. Young, potentially cute, and she spoke some English. I picked a seat as far to the rear as possible so I could see the countryside when it became light. There was a brief runup of engines and off we went down the runway into the overcast at a low level and then came out on top at what I would estimate at about 5,000 feet. I did some reading and the stewardess brought around a menu card, the first I'd seen, printed in English and Russian, saying that she had mineral water, lemonade, tea, cakes and candy. I had some tea and cakes and candy, all quite welcome. The stewardess was trying to do a very good job.

It was 7:30 a.m. before the first sign of dawn appeared off to the left and 8 before it was light enough to see the ground. By this time the overcast was broken and I could see the farming area. It was overcast again by the time we reached Kiev and we went down through it and broke out with lots of ceiling. We made a wide circle of the city and came in for a routine and smooth landing. I was first off the plane (the only one getting off at Kiev, in fact) and was met at the steps by an Intourist representative and in nothing flat I was in a small Pobeda car on my way into the capital of the Ukraine on the Dneiper River.

(To be Continued)

Kiev Airport with Russian-built DC-3. (USSR Photo)

To fly close support for Marine riflemen



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In 1916, Ruth Law flew non-stop from Chicago to Hornell, New York—a distance of 512 miles, to establish a new world's record. She accomplished this in a pusher plane, and her flight was a truly great achievement at that time. From Hornell, she continued on to Binghamton and New York City, for a total distance of 884 miles in less than nine hours.

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